SAMSUNG

Defendants' Markman Presentation

Resonant Systems, Inc.

v.

Samsung Electronics Co., Ltd. et al

Case No. 2:24-cv-00423-JRG-RSP (EDTX)

June 2, 2025

Table of Contents

"control component" ('830 patent, claim 1)

Samsung's Construction	Resonant's Construction
Subject to 35 USC § 112 ¶ 6 **Function**: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values **Structure**: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 710-712, and 718-724, with reference to all steps shown in Figure 7C, or the algorithm described in the corresponding text. See, e.g., '830 patent at 6:52-7:29, 7:31-7:34, 8:20-8:40, and equivalents thereof.	Subject to 35 USC § 112 ¶ 6 **Function**: same as Samsung **Structure**: a microcontroller, a processor, a CPU, or a microprocessor where the microcontroller, processor, CPU, or microprocessor is programmed with an algorithm comprising the following steps: (a) set the mode and strength to default values or values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component; and equivalents thereof.

Issue 1: Prior Constructions

Three different constructions adopted in four proceedings

1. Resonant v. Apple (WDTX) (Aug. 23, 2024)
   Steps 706-716, 730-754 (excluding 734), 760-764

2. Apple v. Resonant (PTAB) (Institution Oct. 15, 2024)
   Same as Resonant v. Apple (WDTX)

3. Resonant v. Sony (EDTX) (Aug. 27, 2024)
   CPU within vibration module, undisputed algorithm – mode + strength

4. Samsung v. Resonant (PTAB) (Jan. 8, 2025)
   CPU, undisputed algorithm – mode + strength

Issue 1: Prior Constructions – Apple WDTX

- Apple says its construction was "faithful to the specification's own description"
- Resonant argues its construction was "**derived** from the intrinsic evidence"

Apple likewise points out that the specification supports these figures represent the "only the particular algorithm required to perform the claimed function [that is] faithful to the specification's own description," *Universal Elecs., Inc. v. Roku, Inc.*, No. 2021-1992, 2023 WL 5316526, at *8 (Fed. Cir. Aug. 18, 2023), "'FIGS. 7A-C provide control-flow diagrams that illustrate the control program, executed by the CPU, that controls operation' of the vibration module." ECF No. 75 at 23 (citing '337 patent, 6:43–45 (the description of Figs. 7A–C appears at 6:43–8:30) & ECF No. 75-6 at 40–44).

Apple WDTX CC Opinion (Dkt. 102-14 (Ex. 29)) at 29.

Resonant proposes a set of steps it argues are derived from the intrinsic evidence and can be understood and applied by the jury. ECF No. 79. Resonant's proposed algorithm follows:

> (a) set the mode and strength to default values or values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component; and equivalents thereof.

Apple WDTX CC Opinion (Dkt. 102-14 (Ex. 29)) at 29 (modified).

Issue 1: Prior Constructions – Apple WDTX

- Apple says its construction was “faithful to the specification’s own description”
- Resonant argues its construction was “**derived** from the intrinsic evidence”

Apple’s Algorithm	Resonant’s Algorithm
the algorithm shown in Figures 7A–C and described at 6:52–8:40; and equivalents thereof	an algorithm comprising the following steps: (a) set the mode and strength to default values or values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component.

Apple WDTX CC Opinion (Dkt. 102-14 (Ex. 29)) at 34.

Issue 1: Prior Constructions – Apple WDTX

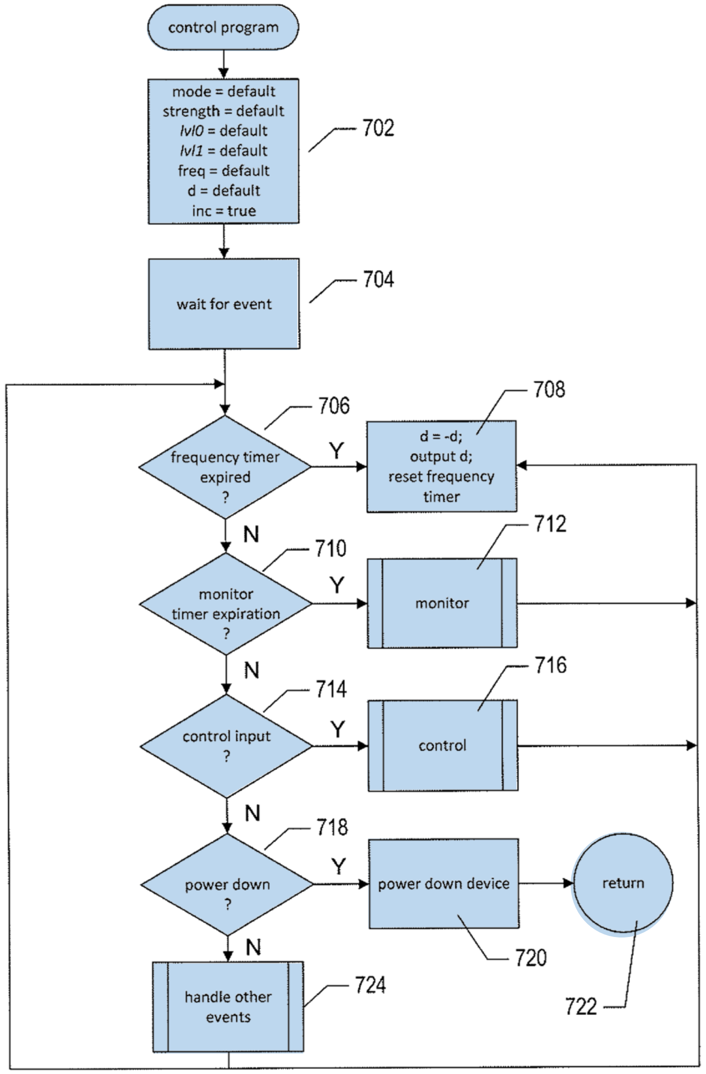


FIG. 7A

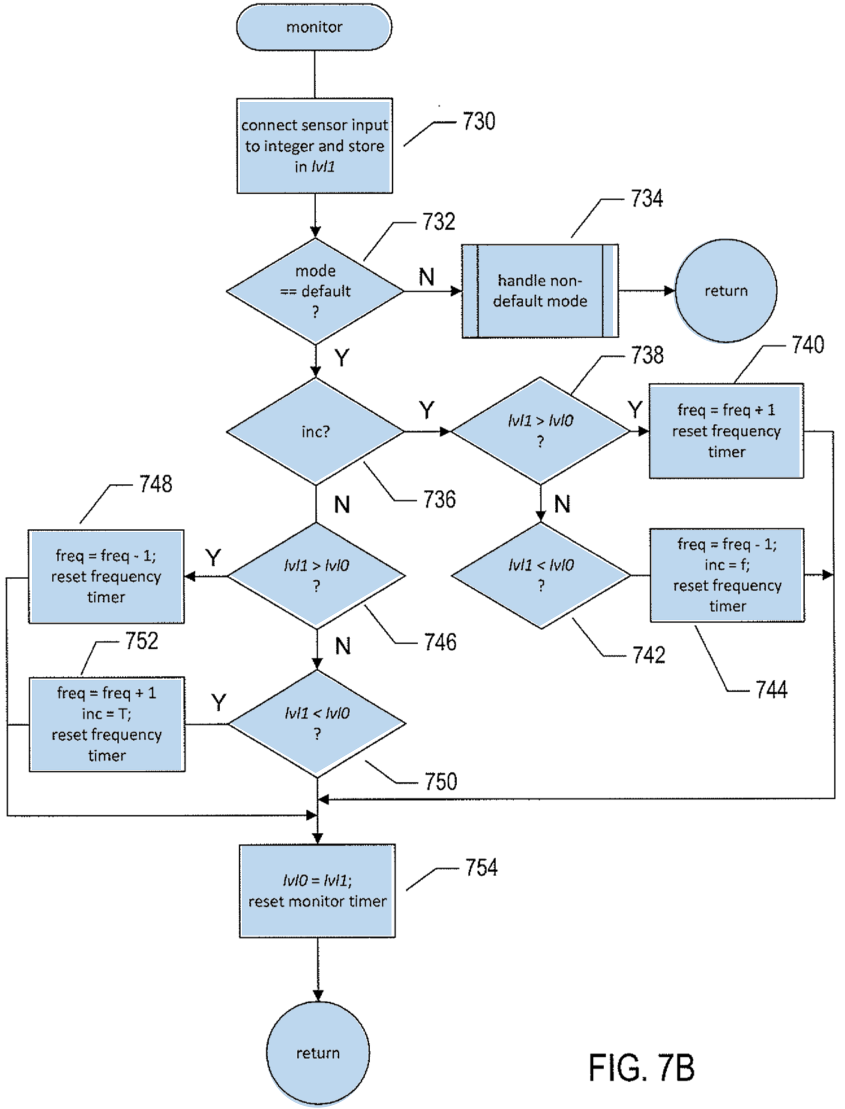


FIG. 7B

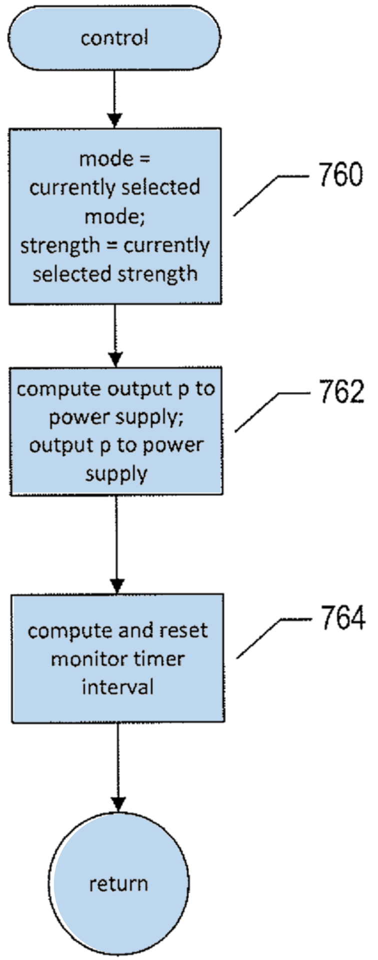


FIG. 7C

Issue 1: Prior Constructions – Apple WDTX

Resonant v. Apple (WDTX) – *Markman* Order

ii. Court's construction

For the reasons above, the Court adopts the parties' understanding that claim 1 and 19 of the '830 patent is subject to means-plus-function treatment, adopts the parties agreed function, and construes the corresponding structure as follows: **a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Steps 706 through 716 in Figure 7A, with reference to all steps shown in Figure 7B other than Step 734 and all steps shown in Figure 7C, or the algorithm described in the corresponding text, See, e.g., 7:20–7:34, 7:42– 7:52, 7:60–8:40, and equivalents thereof.**

Apple WDTX CC Opinion (Dkt. 102-14 (Ex. 29)) at 29.

Issue 1: Prior Constructions – Apple WDTX

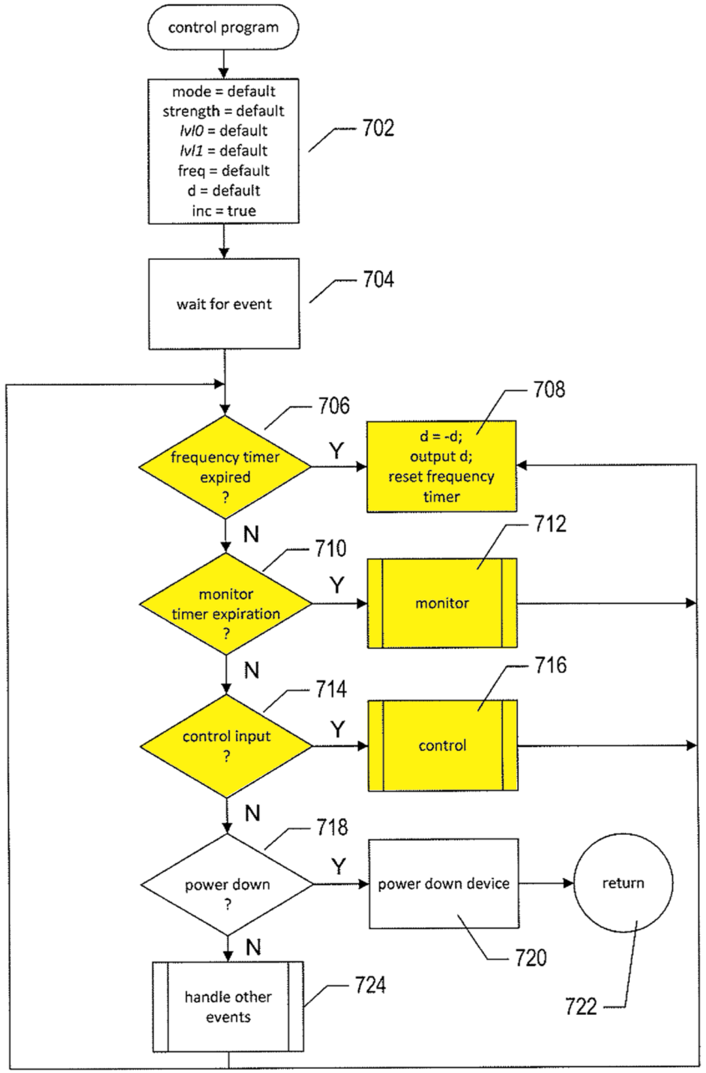


FIG. 7A

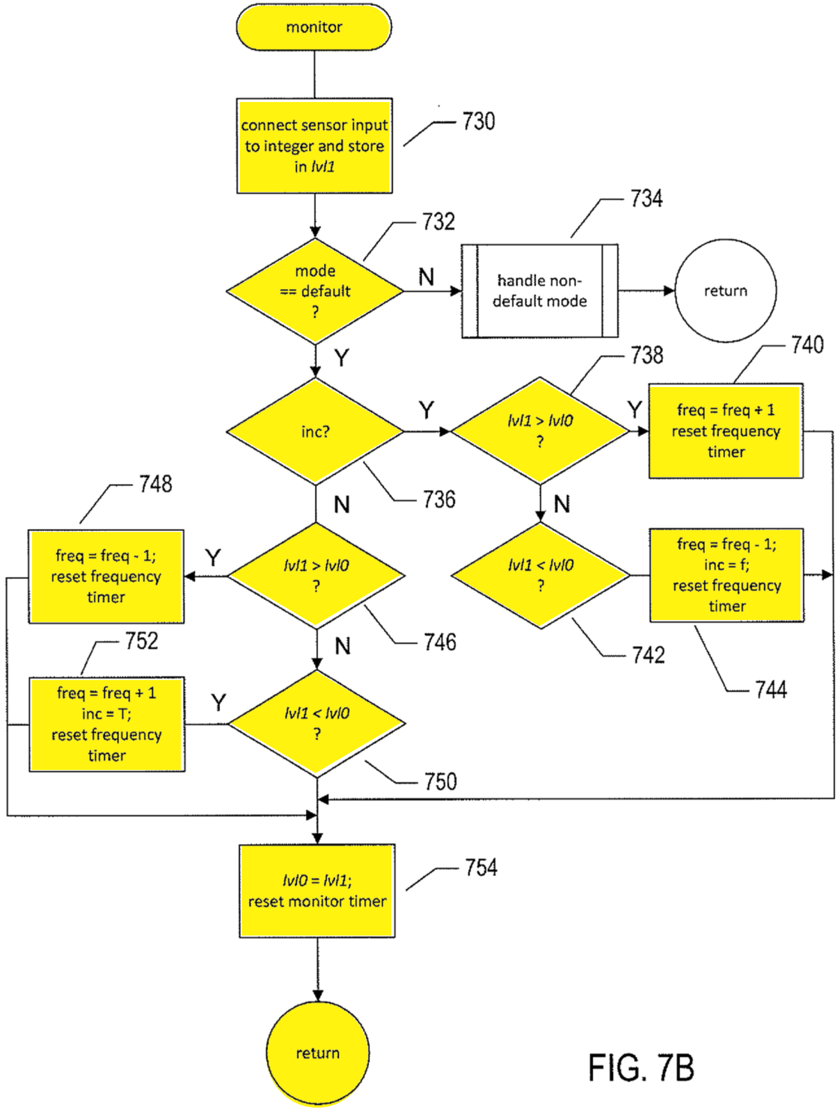


FIG. 7B

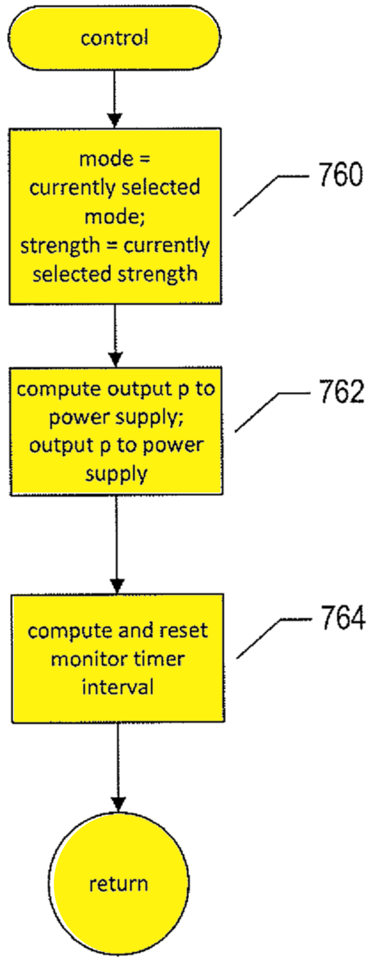


FIG. 7C

Issue 1: Prior Constructions – Apple IPR

Apple v. Resonant (PTAB), No. IPR2024-00806 – Institution Decision

8:40." Pet. 4; Reply 2. Patent Owner proposes the same construction that the District Court has adopted in the Apple Litigation:

> **Function**: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by specified by one or more stored values.
>
> **Structure**: a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Steps 706 through 716 in Figure 7A, with reference to all steps shown in Figure 7B other than Step 734 and all steps shown in Figure 7C, or the algorithm described in the corresponding text, *See, e.g.*, 7:20–7:34, 7:42–7:52, 7:60–8:40, and equivalents thereof.

Prelim. Resp. 8–9 (citing Ex. 2002, 6–7); *see also* Ex. 3001, 33–37 (August

Apple IPR Institution Decision ('830 patent) (Dkt. 102-15 (Ex. 30)) at 13.

Issue 1: Prior Constructions

Resonant v. Samsung (EDTX) – Supplemental Reply Claim Construction Brief

- Resonant claims it never encouraged the PTAB to adopt the Apple district court construction in its supplemental reply brief.

> Samsung accuses RevelHMI of "flip-flop[ping]" in its claim construction positions and of having "encouraged the PTAB to adopt the *Apple* court's construction." Dkt. 102 at 10. But tellingly, Samsung never cites to any of RevelHMI's statements from the Apple IPR allegedly showing such "encouragement," or to any statements from RevelHMI in that IPR at all. *See* Dkt. 102 at 8–10. That is because RevelHMI never argued in favor of Judge Albright's construction from the Apple district court litigation in its statements to the PTAB. It never encouraged the PTAB to adopt that construction, in preference to the construction it proposes to this Court or to any of the other constructions that have been reached in cases concerning the patents asserted here.

Resonant EDTX Supplemental Reply CC Brief (Dkt. 104) at 5.

Issue 1: Prior Constructions – Apple IPR

Apple v. Resonant (PTAB), No. IPR2024-00806 – Patent Owner Response

- Resonant told the PTAB it proposed the same construction "adopted by the District Court in the Apple Litigation."

claims 1 and 19 is a means-plus-function term. (Paper 11 at 20.) For purposes of institution, the Board adopted the construction proposed by Patent Owner, which is same construction of the corresponding structure as adopted by the District Court in the Apple Litigation: "a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Steps 706 through 716 in Figure 7A, with reference to all steps shown in Figure 7B other than Step 734 and all steps shown in Figure 7C, or the algorithm described in the corresponding text, *See, e.g.*, 7:20–7:34, 7:42–7:52, 7:60–8:40, and equivalents thereof." (Paper 11 at 13–14.)

Apple IPR Patent Owner Response ('830 patent) (Dkt. 102-18 (Ex. 33)) at 13-14.

Issue 1: Prior Constructions

Because an IPR proceeding involves reexamination of an earlier administrative grant of a patent, it follows that **statements made by a patent owner during an IPR proceeding can be considered during claim construction** and relied upon to support a finding of prosecution disclaimer.

Aylus Networks, Inc. v. Apple Inc., 856 F.3d 1353, 1361 (Fed. Cir. 2017).

Issue 1: Prior Constructions

> The IPR proceedings will also add to the ’536 Patent’s prosecution history. Prosecution history is an important part of the intrinsic record relevant to claim construction. … **Statements made by [plaintiff] during the IPR** could disclaim claim scope, **aid the court in understanding the meaning of the terms, or otherwise affect the interpretation of key terms**.

Evolutionary Intel., LLC v. Sprint Nextel Corp., No. C-13-03587, 2014 WL 4802426, at *4 (N.D. Cal. Sept. 26, 2014) *(citing Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005)).

Issue 1: Prior Constructions

> The Court finds the FWD itself constitutes potentially material evidence worthy of consideration in the claim construction analysis, notwithstanding any similarity to previous arguments. This conclusion stems from the special status accorded to intrinsic evidence in patent claim construction. **Intrinsic evidence carries significant weight in determining the "legally operative meaning of disputed claim language," particularly when that evidence forms part of the prosecution history.**

Nuhn Indus. Ltd v. Bazooka Farmstar LLC, No. 3:22-CV-00015 (S.D. Iowa May 21, 2025) (citation omitted).

Issue 1: Prior Constructions – Sony, Samsung IPR included "identical" algorithms

Samsung v. Resonant (PTAB) IPR2024-00993 – Final Written Decision

Patent Owner agrees that the control component is a means-plus-function term for which the corresponding structure may be a processor (but not an H Bridge switch) programmed with an algorithm identical to that proposed by Petitioner except for the corresponding output being provided to the driving component rather than to an H-bridge switch. PO Resp. 10, 12–14.

Samsung IPR FWD ('830 patent) (Dkt. 102-9 (Ex. 24)) at 11.

Resonant v. Sony (EDTX) – *Markman* Order

The parties generally agree on the proper § 112 ¶ 6 corresponding structure. The only dispute concerns whether that structure must be within the recited "module."

Sony EDTX CC Opinion (Dkt. 102-13 (Ex. 28)) at 11.

Issue 1: Prior Constructions – Samsung's Original Brief

Resonant v. Samsung (EDTX) – Samsung's (pre-stay) Responsive Claim Const. Brief

- Samsung's original position recognized amplitude is controlled via "the algorithm of Figure 7C" while "frequency is controlled separately in algorithms illustrated in Figures 7A-7B."

> The claimed function requires controlling the moveable component to oscillate at a specified frequency and amplitude. The patents disclose two different mechanisms, one for controlling amplitude and one for controlling frequency. To control amplitude, the algorithm of Figure 7C sets a variable "strength" to the currently selected strength and outputs a value "p" to the power supply so that the power supply "outputs an appropriate current to the coil." *Id.* at 8:10-20, Fig. 7C. But varying the **amount** of current output to the coil is insufficient to control the frequency of oscillation. The patents disclose that frequency is controlled separately in algorithms illustrated in Figures 7A-B through manipulation of the "freq" variable and the "d" control output. Forlines Decl. ¶115. The correct corresponding structure thus requires an output both to the power supply to control the current (output "p") and to the driving component to control the frequency (output "d").[9] This is reflected in Samsung's algorithm.

Samsung's EDTX (pre-stay) Responsive CC Brief (Dkt. 74) at 21-22.

Issue 2: Necessary Steps

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts **<u>described in the specification</u>** and equivalents thereof.

35 U.S.C. § 112, ¶ 6 (pre-AIA).

Issue 2: Necessary Steps

> The district court determined that the structure disclosed in the specification to perform the claimed function was "an algorithm executed by a computer." While this finding accurately reflected the parties' stipulation, **the court erred by failing to limit the claim to the algorithm disclosed in the specification**. The structure of a microprocessor programmed to carry out an algorithm is **limited by the disclosed algorithm**.

WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1348-49 (Fed. Cir. 1999).

Issue 2: Necessary Steps

> The statute does not permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim. Nor does the statute permit incorporation of structure from the written description beyond that necessary to perform the claimed function.

Micro Chem., Inc. v. Great Plains Chem. Co., 194 F.3d 1250, 1258 (Fed. Cir. 1999)

Issue 2: Necessary Steps

1. A vibration module comprising:
a housing;
a moveable component;
a power supply;
user-input features;
a driving component that drives the moveable component to oscillate within the housing; and
a control component that controls supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values.

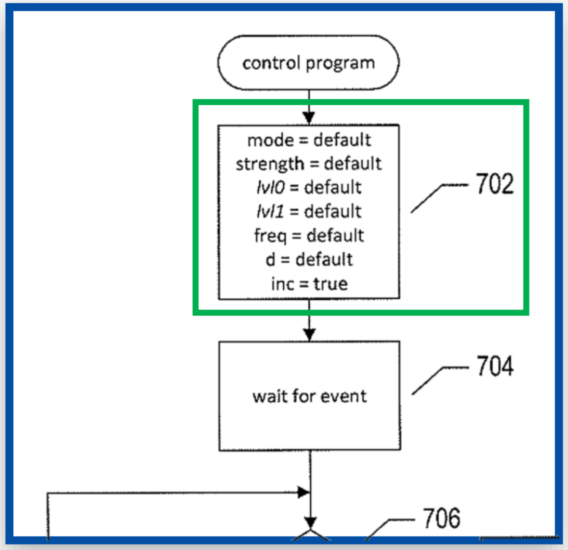
’830 patent at claim 1.

<u>Agreed Function</u>: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a ***frequency*** and an ***amplitude specified by <u>one or more stored values</u>***

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more **stored values**."

Step 702
Step 704
Step 706
Step 708
Step 714
Step 716
Step 760
Step 762
Step 764



'830 Patent at Fig. 7A.

application is directed. FIG. 7A provides a control-flow diagram for the high-level control program. The program begins execution, in step **702**, upon a power-on event invoked by a user through a power button or other user control. In step **702**, various local variables are set to default values, including the variables: (1) mode, which indicates the current operational mode of the device; (2) strength, a numerical value corresponding to the current user-selected strength of operation, corresponding to the electrical current applied to the coil; (3) lvl0, a previously sensed vibrational strength; (4) lvl1, a currently sensed vibrational strength; (5) freq, the current frequency at which the direction of current is alternated in the coil; (6) d, the control output to the H-bridge switch; and (7) inc, a Boolean value that indicates that the frequency is currently being increased. Next, in step

'830 Patent at 6:56-7:3.

Samsung v. Resonant (PTAB) IPR2024-00993 – Final Written Decision

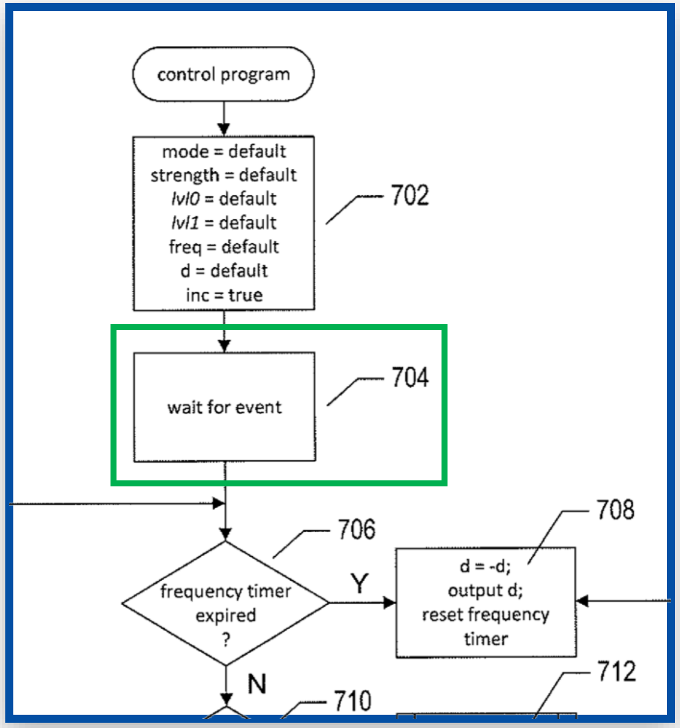
3:49–54, 6:52–54, Figs. 7A–7C. This first algorithmic step is supported by step 702 of Figure 7A, in which the program sets several variables to default values, including the mode variable indicating "the current operational mode of the device," and the strength variable indicating "the current user-selected strength of operation." Ex. 1001, 6:50–64.

Samsung IPR FWD ('830 patent) (Dkt. 102-9 (Ex. 24)) at 12.

Issue 2: Necessary Steps

Function: "… to **cause the moveable component** to oscillate at a frequency and an amplitude specified by one or more stored values."

Step 702
Step 704
Step 706
Step 708
Step 714
Step 716
Step 760
Step 762
Step 764



'830 Patent at Fig. 7A.

that the frequency is currently being increased. Next, in step **704**, the control program waits for a next event. The remaining steps represent a continuously executing loop, or event handler, in which each event that occurs is appropriately handled by the control program. In certain implementations

'830 Patent at 7:3-7.

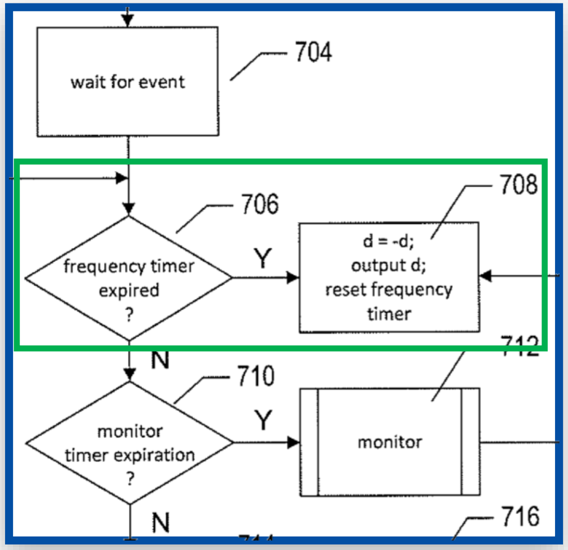
out tasks. When an event occurs, the control program begins a series of tasks, the first of which is represented by the conditional step **706**, to determine what event has occurred and appropriately handle that event. When the frequency

'830 Patent at 7:20-23.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a **frequency** and an amplitude specified by one or more stored values."

Step 702
Step 704
Step 706
Step 708
Step 714
Step 716
Step 760
Step 762
Step 764



'830 Patent at Fig. 7A.

and appropriately handle that event. When the frequency timer has expired, as determined in step **706**, the value of the output signal d is flipped, in step **708**, and output to the H-bridge switch, with the frequency timer being reset to trigger a next frequency-related event. The frequency-timer interval is determined by the current value of the variable freq. Otherwise, when the event is a monitor timer expira-

'830 Patent at 7:23-27.

Apple v. Resonant (PTAB), No. IPR2024-00806 – Institution Decision

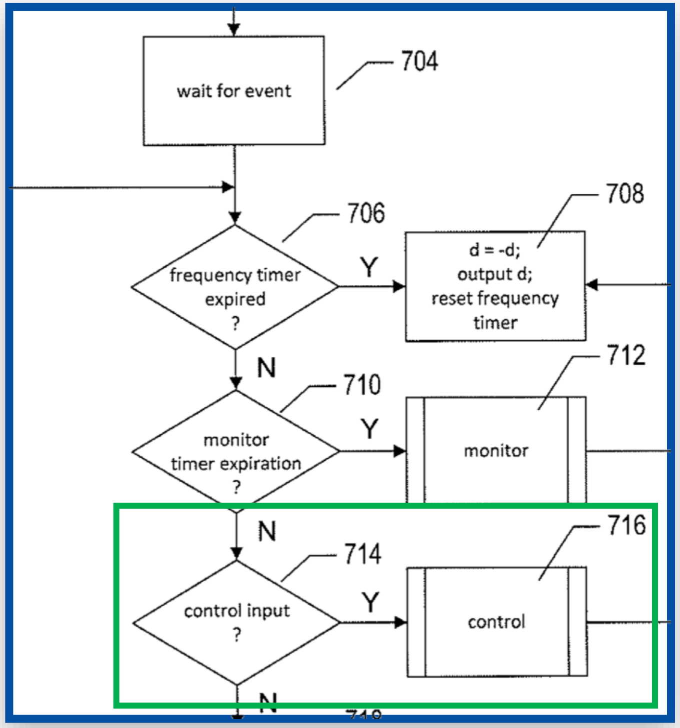
Therefore, the specification clearly links the function of "control[ing] supply of power from the power supply to . . . cause the moveable component to oscillate at a *frequency* . . . specified by one or more stored values" at least to portions of steps 706 and 708 of the flow diagram algorithm of Figure 7A, as described above. Thus, the control component

Apple IPR Institution Decision ('830 patent) (Dkt. 102-15 (Ex. 30)) at 17.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a frequency and an **amplitude** specified by one or more stored values."

Step 702
Step 704
Step 706
Step 708
Step 714
Step 716
Step 760
Step 762
Step 764



'830 Patent at Fig. 7A.

tor" is called in step **712**. Otherwise, when the event corresponds to a change in the user input through the user interface, as determined in step **714**, the routine "control" is called in step **716**. Otherwise, when the event is a power-

'830 Patent at 7:31-34.

FIG. **7**C provides a control-flow diagram for the routine "control," called in step **716** in FIG. **7**A. This routine is invoked when a change in the user controls has occurred. In

'830 Patent at 8:20-22.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a frequency and an **amplitude** specified by one or more stored values."

Step 702
Step 704
Step 706
Step 708
Step 714
Step 716
Step 760
Step 762
Step 764

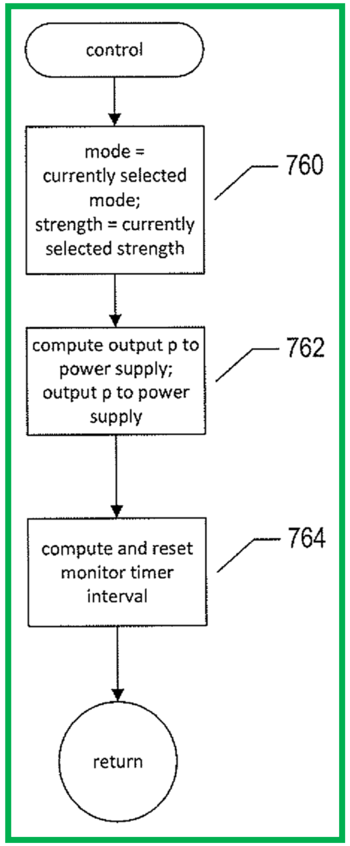


FIG. 7C

'830 Patent at Fig. 7C.

FIG. 7C provides a control-flow diagram for the routine "control," called in step **716** in FIG. **7**A. This routine is invoked when a change in the user controls has occurred. In step **760**, the variables mode and strength are set to the currently selected mode and vibrational strength, represented by the current states of control features in the user interface. Next, in step **762**, the routine "control" computes an output value p corresponding to the currently selected strength, stored in the variable strength, and outputs the value p to the power supply so that the power supply outputs an appropriate current to the coil. Finally, in step **764**, the routine "control" computes a new monitor timer interval and resets the monitor timer accordingly.

'830 Patent at 8:20-32.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a frequency and an **amplitude** specified by one or more stored values."

Step 702
Step 704
Step 706
Step 708
Step 714
Step 716
Step 760
Step 762
Step 764

Samsung v. Resonant (PTAB) IPR2024-00993 – Final Written Decision

Resp. 10; Ex. 2008 ¶¶ 63–64. This second algorithmic step is supported by steps 760 and 762 of Figure 7C, which describe that

> when a change in the user controls has occurred[, i]n step 760, the variables mode and strength are set to the currently selected mode and vibrational strength, represented by the current states of control features in the user interface. Next, in step 762, the routine "control" computes an output value p corresponding to the currently selected strength, stored in the variable strength, and outputs the value p to the power supply so that the power supply outputs an appropriate current to the coil.

Ex. 1001, 8:20–30. Therefore, we agree with Patent Owner's two-step

Samsung IPR FWD ('830 patent) (Dkt. 102-9 (Ex. 24)) at 12.

Apple v. Resonant (PTAB), No. IPR2024-00806 – Institution Decision

The specification thus clearly links step 760, which selects current strength and mode, and step 762, which corresponds to control input 624 transmitted from CPU 602 to power supply 612 in the block diagram of Figure 6, to the recited function, "control supply of power from the power supply to the driving component to cause the moveable component to oscillate at . . . an amplitude specified by one or more stored values." Ex. 1001, 8:20–30, Fig. 7C.

Apple IPR Institution Decision ('830 patent) (Dkt. 102-15 (Ex. 30)) at 20.

Issue 2: Un-necessary Steps

<u>Agreed Function</u>: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values

<u>The recited function does not require varying frequency (Figure 7B)</u>

- The recited function only requires *stored values*, i.e., the values set in step 702
- “freq” (set in step 702) determines the interval of the frequency timer, which determines timing of the current direction change (“d”)

Issue 2: Un-necessary Steps

Resonant's Construction

Subject to 35 USC § 112 ¶ 6

Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values

Structure: a microcontroller, a processor, a CPU, or a microprocessor where the microcontroller, processor, CPU, or microprocessor is programmed with an algorithm comprising the following steps: (a) set the **mode** and strength to default values or values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component; and equivalents thereof.

"Mode" is not required

- '830 patent has different values for "mode" and "freq"

application is directed. FIG. **7A** provides a control-flow diagram for the high-level control program. The program begins execution, in step **702**, upon a power-on event invoked by a user through a power button or other user control. In step **702**, various local variables are set to default values, including the variables: (1) mode, which indicates the current operational mode of the device; (2) strength, a numerical value corresponding to the current user-selected strength of operation, corresponding to the electrical current applied to the coil; (3) lvl0, a previously sensed vibrational strength; (4) lvl1, a currently sensed vibrational strength; (5) freq, the current frequency at which the direction of current is alternated in the coil; (6) d, the control output to the H-bridge switch; and (7) inc, a Boolean value that indicates that the frequency is currently being increased. Next, in step

'830 Patent at 6:56-7:3.

Issue 2: Un-necessary Steps

Resonant's Construction

Subject to 35 USC § 112 ¶ 6
Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values

Structure: a microcontroller, a processor, a CPU, or a microprocessor where the microcontroller, processor, CPU, or microprocessor is programmed with an algorithm comprising the following steps: (a) set the **mode** and strength to default values or values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component; and equivalents thereof.

"Mode" is not required

- Two modes: "default" and "other, more complex operational modes"

LRVM and stores the integer value in the variable lvl1. Next, in step **732**, the routine "monitor" determines whether or not the LRVM is currently operating in the default mode. In the default mode, the LRVM uses continuous feedback control to optimize the vibrational force produced by the LRVM by continuously seeking to operate the LRVM at a frequency as close as possible to the resonant frequency for the LRVM. Other, more complex operational modes may be handled by various more complex routines, represented by step **734** in FIG. **7**B. More complex vibrational modes may systematically and/or periodically alter the frequency or produce various complex, multi-component vibrational modes useful in certain applications, appliances, devices, and systems.

'830 Patent at 7:46-58.

Issue 2: Un-necessary Steps

Resonant's Construction

Subject to 35 USC § 112 ¶ 6

Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values

Structure: a microcontroller, a processor, a CPU, or a microprocessor where the microcontroller, processor, CPU, or microprocessor is programmed with an algorithm comprising the following steps: (a) set the **mode** and strength to default values or values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component; and equivalents thereof.

"Mode" is not required

- No algorithm for "other, more complex" modes is provided

Other, more complex operational modes may be handled by various more complex routines, represented by step **734** in FIG. **7**B. More complex vibrational modes may systematically and/or periodically alter the frequency or produce various complex, multi-component vibrational modes useful in certain applications, appliances, devices, and systems. These more complex modes are application dependent, and are not further described in the control-flow diagrams. In the

'830 Patent at 7:46-58.

Issue 2: Necessary Steps

Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a **frequency** and an **amplitude** specified by one or more stored values

Frequency Control	Amplitude Control
Step 702 – "freq" set and stored	Step 702 – "strength" set and stored
Step 704 – loop entered	Step 704 – loop entered
Step 706 – frequency timer expired	Step 706
Step 708 – output "d" flipped	Step 708
Step 714	Step 714 – input received
Step 716	Step 716 – control routine called
Step 760	Step 760 – "strength" set to current value
Step 762	Step 762 – output "p" calculated & output
Step 764	Step 764 – return to loop

Issue 3: Resonant’s Algorithm Does Not Reflect the Disclosure

In accordance with *WMS Gaming*, reference to the patent specification to identify **specific algorithms** the computer is programmed to perform may be done with explicit reference to text or figures in the specification, by reference to column and line numbers, or by identification of alternative algorithms disclosed in the specification.

* * *

[The party’s] construction applying simply a “ranking algorithm” **improperly broadens the claim by ignoring specific structural embodiments in the specification**. Because the ’567 Patent both specifically claims the embodiments of the algorithms and dedicates a substantial portion of the specification to describe them, **excluding such algorithms from the corresponding structure would be contrary to the purpose of means-plus-function construction**.

Individual Network, LLC v. Apple, Inc., 2009 WL 81795, at *8-*9 (E.D. Tex. Jan. 12, 2009) (citing *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999)).

Issue 3: Resonant's Algorithm Does Not Reflect the Disclosure

> For claims "to serve their proper function of providing the public clear notice of the scope of the patentee's property rights, we **cannot allow** a patentee to claim in functional terms **essentially unbounded** by any reference to what one of skill in the art would understand from the public record."

Philips N. Am., LLC v. Garmin Int'l, Inc., 2024 WL 3824807, at *4 (Fed. Cir. Aug. 15, 2024) (quoting *Med. Instrumentation & Diagnostics Corp. v. Elekta AB*, 344 F.3d 1205, 1219 (Fed. Cir. 2003)).

Issue 3: Resonant's Algorithm Does Not Reflect the Disclosure

As to the algorithm, **Maxell seeks to pick and choose steps of the algorithms shown in Figures 4 and 9**, including the step of determining if there is a format change or not (step S6) and the "transmit decoding process code" step S7 when change is detected in step S6.

* * *

The algorithm that corresponds to the claimed function includes the entire algorithms of Figures 4 and 9. Figure 5 shows these steps in relation to the various system components, however, the algorithm itself is described in Figures 4 and 9.

Maxell Ltd. v. Huawei Device USA Inc., 297 F. Supp. 3d 668, 744 (E.D. Tex. 2018).

Issue 4: Location of Control Component

Applicant Remarks Overcoming Cited Art

However, the controller of Houston resides in a computer, and is separate from the vibrating device; see, e.g., Fig. 38 and the text associated with Fig. 38. Thus, the stored values of Houston are not in the same module as the vibrating device. In other words, the sensations felt by a user 626 are sent by a system controller 622 to a haptic interface 624.

These are separate units and not contained in a vibration module and thus is in contrast to the language of Applicants' claim 1, which recites that the "vibration module [comprises] ... [the] control component ... to cause the moveable component to oscillate at a frequency and amplitude specified by one or more stored values". Consequently, the proposed modification would change the principal of operation of Blenk, which includes all of its components in a single module, as compared to the haptic device of Houston, which separates its components. A massage device that had to be connected to an external controller would defeat its purpose as a self-contained, hand-held device. Accordingly, claim 1 and the claims dependent thereon are considered to be patentable over the combination of the references.

’830 Patent Prosecution History (Dkt. 102-5 (Ex. 20)) at 78-79.

The applicant distinguished prior art by explaining the controller in the cited art “is separate from the vibrating device”

The applicant continued that because the controller is in a “separate unit[] and not contained in a vibration module,” the cited art “is in contrast to the language of Applicants’ claim 1.”

Issue 4: Location of Control Component

Resonant v. Sony – *Markman* Order

Patent). In its remarks, the applicant clearly and unmistakably characterized the "system controller" and "haptic interface" of Houston as "separate units and not contained in a vibration module." '830 Patent File Wrapper, Dkt. No. 65-6 at 25–26. A skilled artisan would understand from those arguments that the claimed vibration module requires a control component that is *not* separate and *is* contained within the module, and that understanding is consistent with the specification's description of the control component's location. Accordingly, the Court adopts Sony's requirement that the "control component" must be within the module for the '830 Patent's claims.

Sony EDTX CC Opinion (Dkt. 102-13 (Ex. 28)) at 12-13.

This Court found the applicant's statements to be disclaimer sufficient to limit to location of the control component to be "within the [vibration] module."

“control component” (’830 patent, claim 1)

Samsung’s Construction

Subject to 35 USC § 112 ¶ 6

Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by one or more stored values

Structure: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 710-712, and 718-724, with reference to all steps shown in Figure 7C, or the algorithm described in the corresponding text. See, e.g., ’830 patent at 6:52-7:29, 7:31-7:34, 8:20-8:40, and equivalents thereof.

"control component" ('081 patent, claim 1)

Samsung's Construction	Resonant's Construction
Subject to 35 USC § 112 ¶ 6 **Function**: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by user input received from the user-input features **Structure**: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. See, e.g., '081 patent at 6:43-7:24, 7:32-7:42, 7:50-8:30, and equivalents thereof.	Subject to 35 USC § 112 ¶ 6 **Function**: same as Samsung **Structure**: a microcontroller, a processor, a CPU, or a microprocessor where the microcontroller, processor, CPU, or microprocessor are programmed with an algorithm comprising the following steps: (a) set the mode and strength to values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding output to the driving component and equivalents thereof.

“control component” (’081 patent, claim 1)

1. A linear vibration module comprising:
a housing;
a moveable component;
a power supply;
user-input features;
a driving component that drives the moveable component in each of two opposite directions within the housing; and
a control component that controls supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by user input received from the user-input features.

’081 patent at claim 1.

Agreed Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a ***frequency*** and an ***amplitude specified by user input*** received from the user-input features

“control component” (’081 patent, claim 1)

’081 Patent Function	’830 Patent Function
Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude **specified by user input received from the user-input features**	**Function**: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude **specified by one or more stored values**

- ’830 Patent only requires oscillation control according to *stored values*
- ’081 Patent requires oscillation control according to *user input*
  - Corresponding structure must allow changes to the values for “freq” and “strength” to change the frequency and amplitude of oscillation
  - Without changing these variables, oscillation would only occur at a frequency and amplitude specified by *stored values* (i.e., the function recited in the ’830 patent)

Issue 1: Resonant's Algorithm Does Not Enable Frequency Control

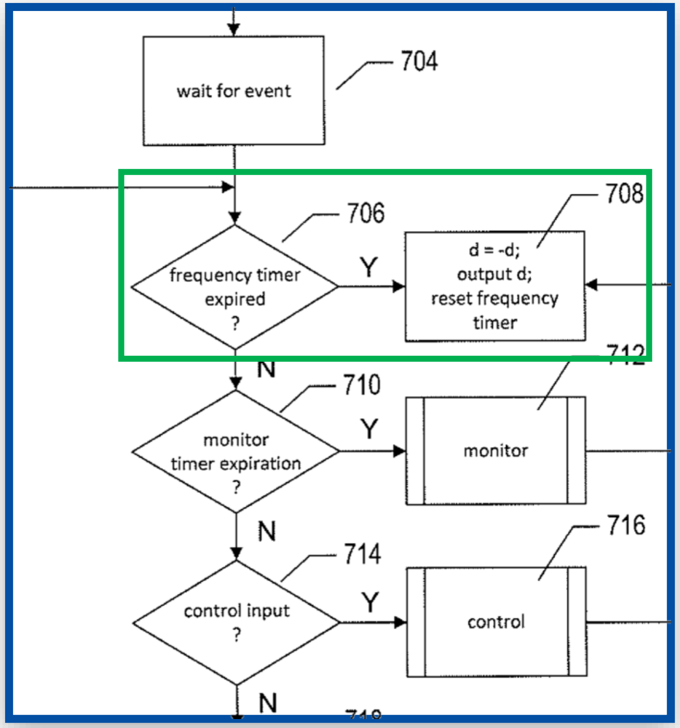
Second, the Court must identify the corresponding structure in the patent specification that performs the function. **The corresponding structure must be capable of performing the claimed function.** Structure disclosed in the specification is "corresponding" structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim. Additionally, the scope of a means-plus-function limitation does not extend to all means for performing a certain function but is, instead, **sharply limited to the structure disclosed in the specification and its equivalents**.

Nat'l Oilwell DHT, L.P. v. Amega W. Servs., LLC, 2019 WL 1787250, at *8 (E.D. Tex. Apr. 24, 2019) (internal citations omitted).

Issue 1: Frequency Control

Function: "… to cause the moveable component to oscillate at a **frequency** and an amplitude specified by user input received from the user-input features."

- The frequency of oscillation is controlled by switching the direction of current through output signal d.
- The frequency timer interval is determined by the value for "freq"



'081 Patent at Fig. 7A.

has occurred and appropriately handle that event. When the frequency timer has expired, as determined in step **706**, the value of the output signal d is flipped, in step **708**, and output to the H-bridge switch, with the frequency timer being reset to trigger a next frequency-related event. The frequency-timer interval is determined by the current value of the variable freq.

'081 Patent at 7:13-18.

Issue 1: Frequency Control

“freq” is changed in Figure 7B steps 740, 744, 748, 752

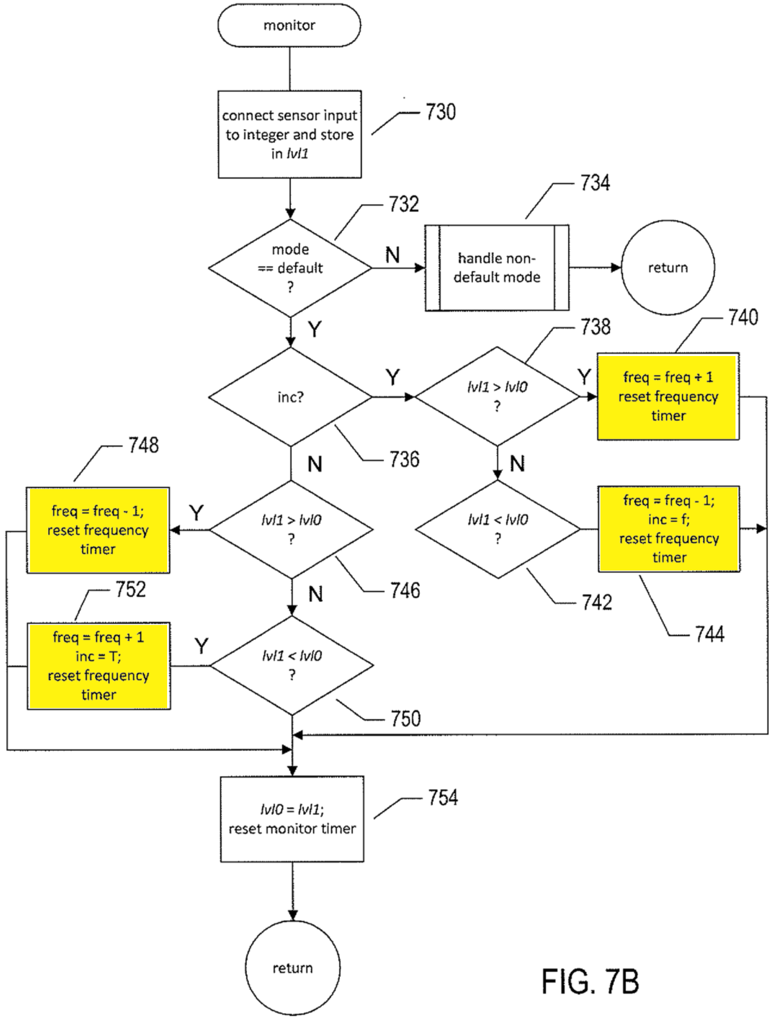


FIG. 7B

’081 Patent at Figure 7B.

further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine “monitor” determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine “monitor” increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine “monitor” decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine “monitor” increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

’081 Patent at 7:50-8:9.

Issue 1: Frequency Control

"freq" is changed depending on the results of steps 730, 732, 736, 738, 742, 746, 750, 754

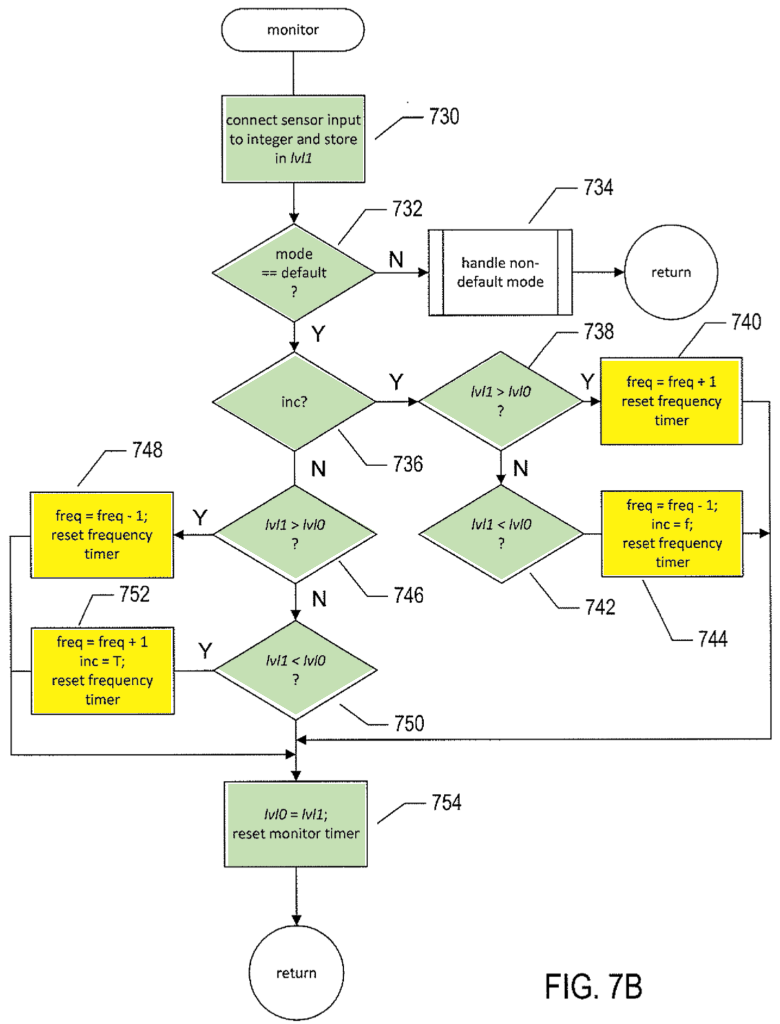


FIG. 7B

'081 Patent at Figure 7B.

further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine "monitor" determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine "monitor" increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine "monitor" decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine "monitor" increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:50-8:9.

FIG. **7B** provides a control-flow diagram for the routine "monitor," called in step **712** of FIG. **7A**. In step **730**, the routine "monitor" converts the sensor input to an integer representing the current vibrational force produced by the LRVM and stores the integer value in the variable lvl1. Next,

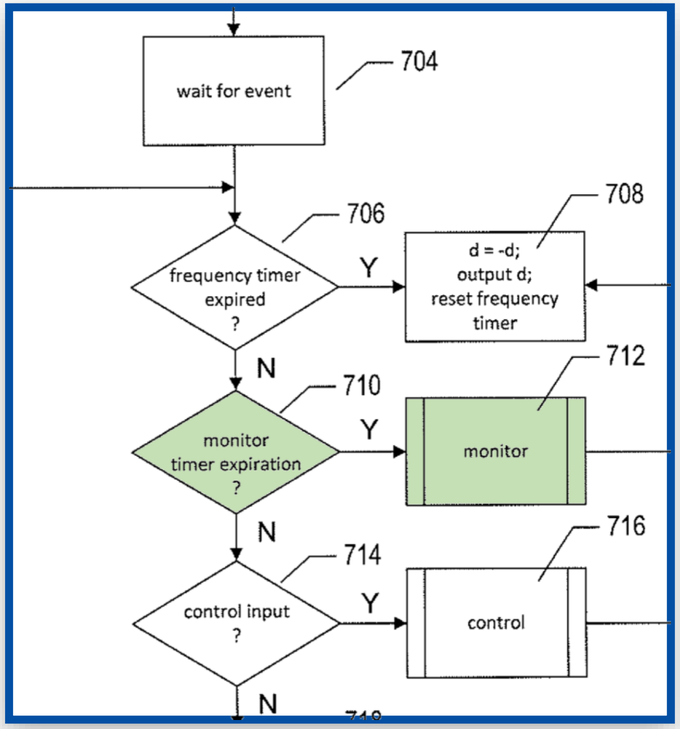
* * *

TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:32-8:9.

Issue 1: Frequency Control

The algorithm in Figure 7B is called on monitor timer expiration in steps 710, 712



’081 Patent at Fig. 7A.

Otherwise, when the event is a monitor timer expiration event, as determined in step **710**, then a routine “monitor” is called in step **712**. Otherwise, when the event corresponds to

* * *

FIG. **7**B provides a control-flow diagram for the routine “monitor,” called in step **712** of FIG. **7**A. In step **730**, the

’081 Patent at 7:19-21, 7:32-33.

Issue 1: Frequency Control

In accordance with *WMS Gaming*, reference to the patent specification to identify **specific algorithms** the computer is programmed to perform may be done with explicit reference to text or figures in the specification, by reference to column and line numbers, or by identification of alternative algorithms disclosed in the specification.

* * *

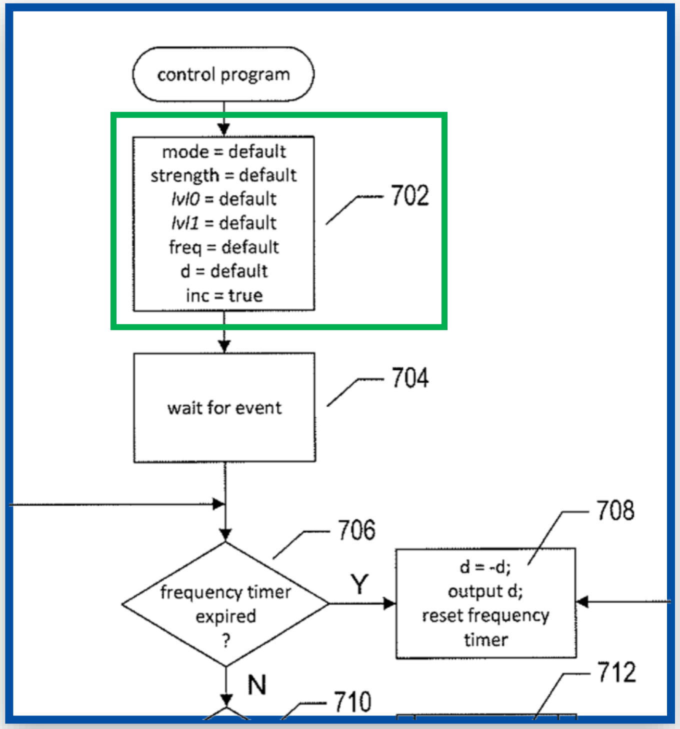
Because the ’567 Patent both specifically claims the embodiments of the algorithms and dedicates a substantial portion of the specification to describe them, excluding such algorithms from the corresponding structure would be contrary to the purpose of means-plus-function construction.

Individual Network, LLC v. Apple, Inc., 2009 WL 81795, at *8-*9 (E.D. Tex. Jan. 12, 2009) (citing *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999)).

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a frequency and an amplitude **specified by** user input received from the user-input features."

Step 702
Step 704
Step 706-708
Step 710-712
Step 730-754
(excluding 734)
Step 714-716
Step 760-764



'081 Patent at Fig. 7A.

cation is directed. FIG. 7A provides a control-flow diagram for the high-level control program. The program begins execution, in step **702**, upon a power-on event invoked by a user through a power button or other user control. In step **702**, various local variables are set to default values, including the variables: (1) mode, which indicates the current operational mode of the device; (2) strength, a numerical value corresponding to the current user-selected strength of operation, corresponding to the electrical current applied to the coil; (3) lvl0, a previously sensed vibrational strength; (4) lvl1, a currently sensed vibrational strength; (5) freq, the current frequency at which the direction of current is alternated in the coil; (6) d, the control output to the H-bridge switch; and (7) inc., a Boolean value that indicates that the frequency is currently being increased. Next, in step **704**, the control pro-

'081 Patent at 6:47-61.

Issue 2: Necessary Steps

Function: "… to **cause the moveable component** to oscillate at a frequency and an amplitude specified by user input received from the user-input features."

Step 702

Step 704

Step 706-708

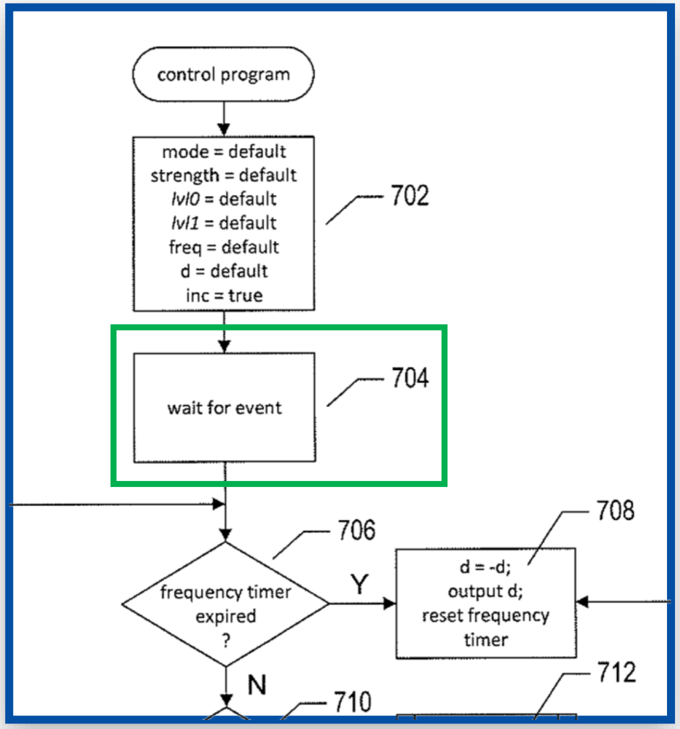
Step 710-712

Step 730-754

(excluding 734)

Step 714-716

Step 760-764



'081 Patent at Fig. 7A.

currently being increased. Next, in step **704**, the control program waits for a next event. The remaining steps represent a continuously executing loop, or event handler, in which each event that occurs is appropriately handled by the control program. In certain implementations of the control program,

'081 Patent at 6:61-65.

cally carrying out tasks. When an event occurs, the control program begins a series of tasks, the first of which is represented by the conditional step **706**, to determine what event has occurred and appropriately handle that event. When the

'081 Patent at 7:10-13.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a **frequency** and an amplitude specified by user input received from the user-input features."

Step 702

Step 704

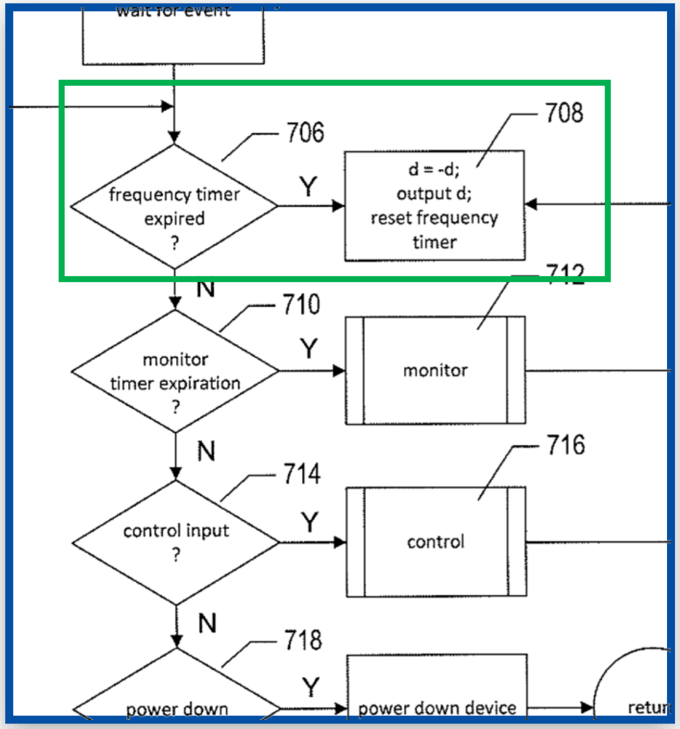
Step 706-708

Step 710-712

Step 730-754
(excluding 734)

Step 714-716

Step 760-764



'081 Patent at Fig. 7A.

has occurred and appropriately handle that event. When the frequency timer has expired, as determined in step **706**, the value of the output signal d is flipped, in step **708**, and output to the H-bridge switch, with the frequency timer being reset to trigger a next frequency-related event. The frequency-timer interval is determined by the current value of the variable freq.

'081 Patent at 7:13-18.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a **frequency** and an amplitude specified by user input received from the user-input features."

Step 702

Step 704

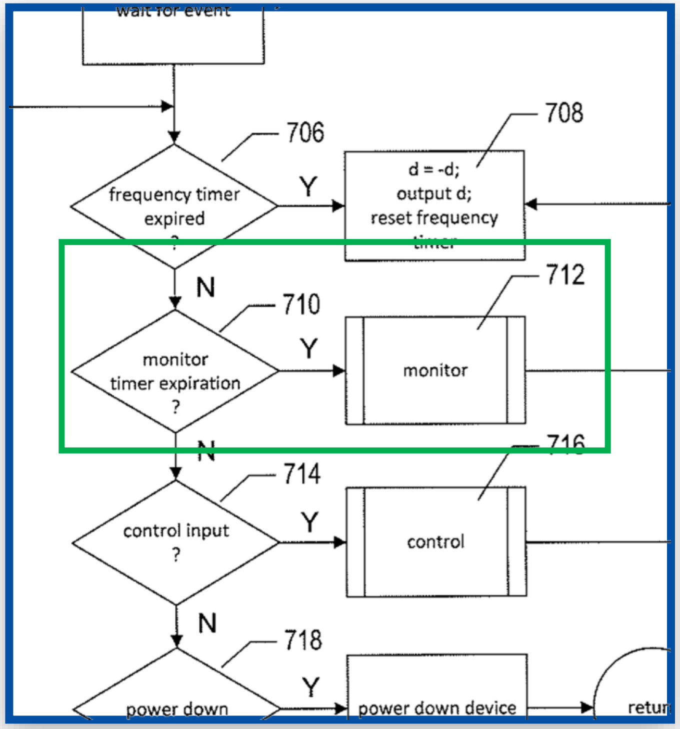
Step 706-708

Step 710-712

Step 730-754 (excluding 734)

Step 714-716

Step 760-764



'081 Patent at Fig. 7A.

Otherwise, when the event is a monitor timer expiration event, as determined in step **710**, then a routine "monitor" is called in step **712**. Otherwise, when the event corresponds to

* * *

FIG. **7B** provides a control-flow diagram for the routine "monitor," called in step **712** of FIG. **7A**. In step **730**, the

'081 Patent at 7:19-21, 7:32-33.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a **frequency** and an amplitude specified by user input received from the user-input features."

Step 702

Step 704

Step 706-708

Step 710-712

Step 730-754

(excluding 734)

Step 714-716

Step 760-764

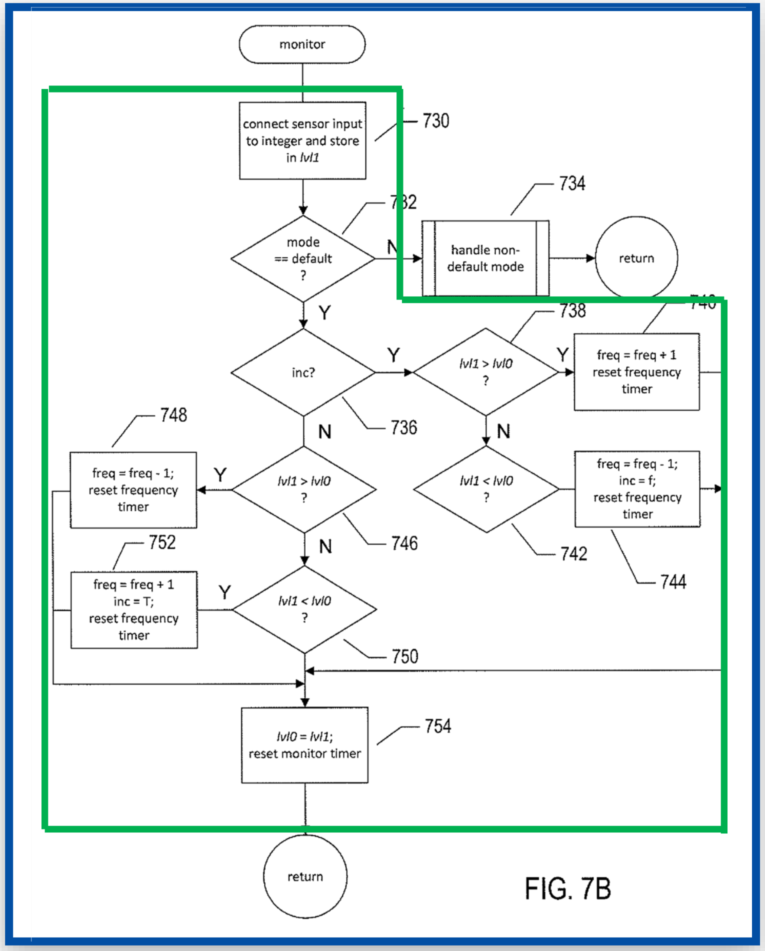


FIG. 7B

'081 Patent at Fig. 7B.

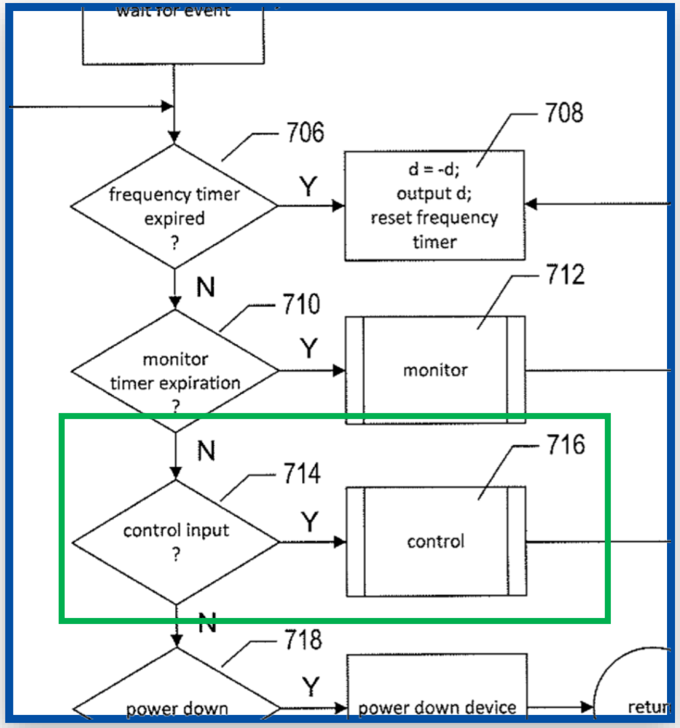
further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine "monitor" determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine "monitor" increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine "monitor" decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine "monitor" increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:50-8:9.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a frequency and an **amplitude** specified by user input received from the user-input features."

Step 702
Step 704
Step 706-708
Step 710-712
Step 730-754
(excluding 734)
Step 714-716
Step 760-764



'081 Patent at Fig. 7A.

called in step **712**. Otherwise, when the event corresponds to a change in the user input through the user interface, as determined in step **714**, the routine "control" is called in step **716**. Otherwise, when the event is a power-down event, as

'081 Patent at 7:21-24.

FIG. **7**C provides a control-flow diagram for the routine "control," called in step **716** in FIG. **7**A. This routine is invoked when a change in the user controls has occurred. In

'081 Patent at 8:10-12.

Issue 2: Necessary Steps

Function: "… to cause the moveable component to oscillate at a frequency and an **amplitude** specified by user input received from the user-input features."

Step 702
Step 704
Step 706-708
Step 710-712
Step 730-754
(excluding 734)
Step 714-716
Step 760-764

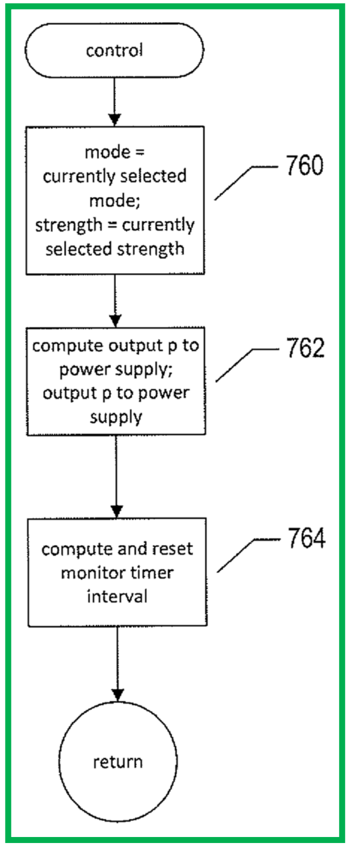


FIG. 7C

'081 Patent at Fig. 7C.

FIG. 7C provides a control-flow diagram for the routine "control," called in step **716** in FIG. **7**A. This routine is invoked when a change in the user controls has occurred. In step **760**, the variables mode and strength are set to the currently selected mode and vibrational strength, represented by the current states of control features in the user interface. Next, in step **762**, the routine "control" computes an output value p corresponding to the currently selected strength, stored in the variable strength, and outputs the value p to the power supply so that the power supply outputs an appropriate current to the coil. Finally, in step **764**, the routine "control" computes a new monitor timer interval and resets the monitor timer accordingly.

'081 Patent at 8:10-22.

Issue 2: Necessary Steps

Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a **frequency** and an **amplitude** specified by user input received from the user-input features

Frequency Control	Amplitude Control
Step 702 – "freq" set and stored	Step 702 – "strength" set and stored
Step 704 – loop entered	Step 704 – loop entered
Step 706 – frequency timer expired	Step 706
Step 708 – output "d" flipped	Step 708
Steps 710-712 – enter "monitor" routine	Steps 710-712
Steps 730-754 (excluding 734) – modify value of "freq," interval of frequency timer	Steps 730-754 (excluding 734)
Steps 714-716	Steps 714-716 – enter "control" routine
Step 760	Step 760 – "strength" set to current value
Step 762	Step 762 – output "p" calculated & output
Step 764	Step 764 – return to loop

Issue 3: Location of Control Component

Applicant Remarks Overcoming Cited Art

However, the controller of Houston resides in a computer, and is separate from the vibrating device; see, e.g., Fig. 38 and the text associated with Fig. 38. Thus, the stored values of Houston are not in the same module as the vibrating device. In other words, the sensations felt by a user 626 are sent by a system controller 622 to a haptic interface 624.

These are separate units and not contained in a vibration module and thus is in contrast to the language of Applicants' claim 1, which recites that the "vibration module [comprises] ... [the] control component ... to cause the moveable component to oscillate at a frequency and amplitude specified by one or more stored values". Consequently, the proposed modification would change the principal of operation of Blenk, which includes all of its components in a single module, as compared to the haptic device of Houston, which separates its components. A massage device that had to be connected to an external controller would defeat its purpose as a self-contained, hand-held device. Accordingly, claim 1 and the claims dependent thereon are considered to be patentable over the combination of the references.

’830 Patent Prosecution History (Dkt. 102-5 (Ex. 20)) at 78-79.

The applicant distinguished prior art by explaining the controller in the cited art “is separate from the vibrating device”

The applicant continued that because the controller is in a “separate unit[] and not contained in a vibration module,” the cited art “is in contrast to the language of Applicants’ claim 1”

Issue 3: Location of Control Component

Resonant v. Sony – *Markman* Order

Patent). In its remarks, the applicant clearly and unmistakably characterized the "system controller" and "haptic interface" of Houston as "separate units and not contained in a vibration module." '830 Patent File Wrapper, Dkt. No. 65-6 at 25–26. A skilled artisan would understand from those arguments that the claimed vibration module requires a control component that is *not* separate and *is* contained within the module, and that understanding is consistent with the specification's description of the control component's location. Accordingly, the Court adopts Sony's requirement that the "control component" must be within the module for the '830 Patent's claims.

Sony EDTX CC Opinion (Dkt. 102-13 (Ex. 28)) at 12-13.

This Court found the applicant's statements to be disclaimer sufficient to limit to location of the control component to be "within the [vibration] module"

Issue 3: Location of Control Component

Resonant v. Sony – *Markman* Order

The present record is closer to *Microsoft* than *Oyster Optics*. For one, although not dispositive on the issue, the prosecution-history arguments here do not stem from amendments to the claims and related arguments. Rather, the applicant characterized the invention as a whole by referencing not just the "control component" limitation, but also the preamble and the transitional word "comprising." '830 Patent File Wrapper, Dkt. No. 65-6 at 25–26. And notably, very similar language—including very similar preambles—occurs in all claims for which this term is at issue. *See* Table 1 *supra*. Given that similarity, the Court is hard-pressed to see how the applicants' characterization of "module comprising" vis-à-vis Houston would not apply to the other claims. That is, a skilled artisan *would* consider the applicants' arguments as characterizing the invention as a whole, and *would not* read the various claims as having such fundamentally different scope.

Sony EDTX CC Opinion (Dkt. 102-13 (Ex. 28)) at 15.

This Court recognized the disclaimer also applies to the '081 patent

“control component” (’081 patent, claim 1)

Samsung’s Construction

Subject to 35 USC § 112 ¶ 6

Function: controlling supply of power from the power supply to the driving component to cause the moveable component to oscillate at a frequency and an amplitude specified by user input received from the user-input features

Structure: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. See, e.g., ’081 patent at 6:43-7:24, 7:32-7:42, 7:50-8:30, and equivalents thereof.

“control component” (both patents, claim 3)

Samsung’s Construction	Resonant’s Construction
Subject to 35 USC § 112 ¶ 6 **Function**: receiving output signals from sensors within the [linear] vibration module during operation of the [linear] vibration module and adjusting one or more operational control outputs of the control component according to the received output signals from the sensors **Structure**: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. See, e.g., ’081 patent at 6:43-7:24, 7:32-7:42, 7:50-8:30, and equivalents thereof.	Subject to 35 USC § 112 ¶ 6 **Function**: same as Samsung **Structure**: No additional algorithmic structure beyond that of claim 1. Microprocessor or microcontroller 602; processor or CPU (*see, e.g.*, Fig. 7A steps 706, 708 and/or Fig. 7B steps 730, 736-754 and/or Fig. 7C Step 762); and equivalents thereof. [if additional algorithmic structure is required] where the microcontroller, processor, CPU, or microprocessor is programmed with an algorithm comprising the following steps: (a) receive the value of an output signal; (b) compare that value to a different value, which could be a previous value; and (c) adjust one or more operational control outputs based on that comparison.

“control component” (both patents, claim 3)

- Resonant’s opening brief listed many overlapping steps to Samsung’s construction
- Resonant’s reply listed a completely different set of steps

Resonant Opening Brief	Samsung’s Construction	Resonant’s Reply Brief
Subject to 35 U.S.C. § 112 ¶ 6. **Function**: receiving output signals from sensors within the [linear] vibration module during operation of the [linear] vibration module and adjusting one or more operational control outputs of the control component according to the received output signals from the sensors. **Structures**: microprocessor or microcontroller 602; processor or CPU (*see, e.g.*, Fig. 7A steps 706, 708 and/or Fig. 7B steps 730, 736-754 and/or Fig. 7C Step 762); and equivalents thereof.	Subject to 35 U.S.C. § 112 ¶ 6. **Function**: Same. **Structure**: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. *See, e.g.*, ’830 patent at 6:52-7:34, 7:42-7:52, 7:60-8:40, and equivalents thereof.	Subject to 35 U.S.C. § 112 ¶ 6. **Function**: Same. **Structures**: No additional algorithmic structure beyond that of claim 1. Microprocessor or microcontroller 602; processor or CPU (*see, e.g.*, Fig. 7A steps 706, 708 and/or Fig. 7B steps 730, 736-754 and/or Fig. 7C Step 762); and equivalents thereof. [if additional algorithmic structure is required] where the microcontroller, processor, CPU, or microprocessor is programmed with an algorithm comprising the following steps: (a) receive the value of an output signal; (b) compare that value to a different value, which could be a previous value; and (c) adjust one or more operational control outputs based on that comparison

Issue 1: Whether an Algorithm is Required

In cases such as this one, involving a special purpose computer-implemented means-plus-function limitation, this court has **consistently required that the structure disclosed in the specification be more than simply a general purpose computer or microprocessor**. We require that the specification disclose an algorithm for performing the claimed function.

Noah Sys. Inc. v. Intuit Inc., 675 F.3d 1302, 1312 (Fed. Cir. 2012).
(internal quotations omitted)

Issue 1: Whether an Algorithm is Required

Function: "… **adjusting one or more operational control outputs of the control component** according to the received output signals from the sensors"

"[I]t is only in the rare circumstances where any general-purpose computer without any special programming can perform the function that an algorithm need not be disclosed." The court found that an algorithm was needed to lend sufficient structure to the terms at issue because "[t]he 'control means' at issue in this case cannot be performed by a general-purpose computer without any special programming. **The function of 'controlling the adjusting means' requires more than merely plugging in a general-purpose computer.**"

EON Corp. IP Holdings LLC v. AT & T Mobility LLC, 785 F.3d 616, 621 (Fed. Cir. 2015) (quoting *Ergo Licensing, LLC v. CareFusion 303, Inc.*, 673 F.3d 1361, 1365 (Fed. Cir. 2012)).

Issue 2: Necessary Steps

Function: “receiving output signals from sensors (step 730) … adjusting one or more operational control outputs of the control component (steps 740, 744, 748, 752) according to the received output signals from the sensors (steps 738, 742, 746, 750)”

Step 702

Step 704

Step 706-708

Step 710-712

Step 730-754

(excluding 734)

Step 714-716

Step 760-764

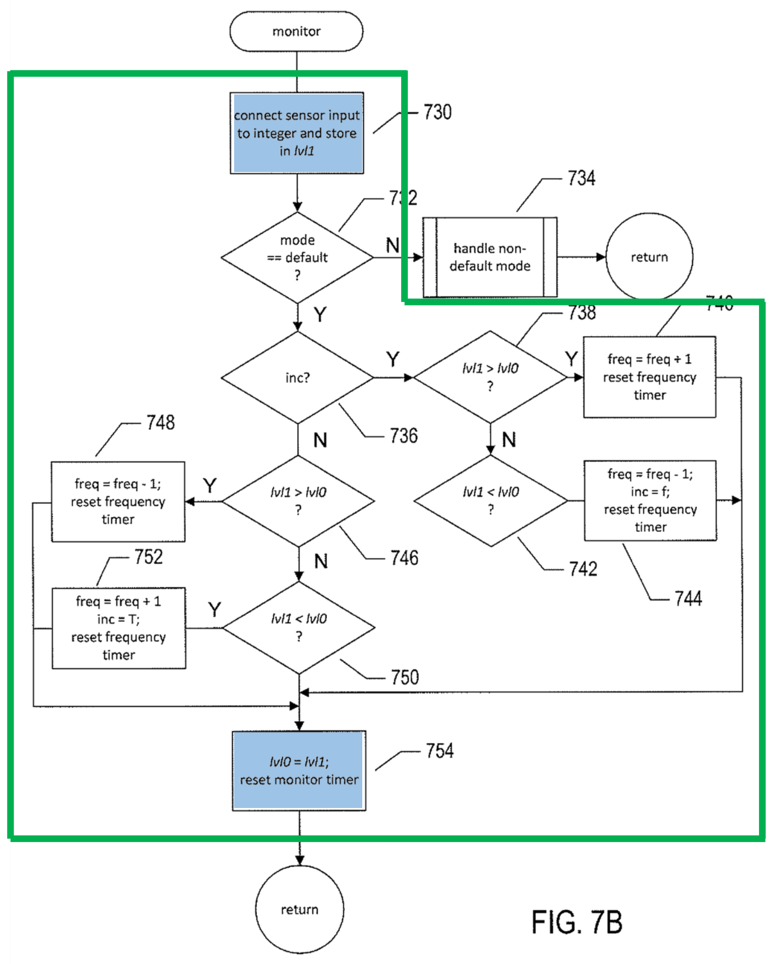


FIG. 7B

’081 Patent at Figure 7B.

FIG. 7B provides a control-flow diagram for the routine “monitor,” called in step **712** of FIG. **7**A. In step **730**, the routine “monitor” converts the sensor input to an integer representing the current vibrational force produced by the LRVM and stores the integer value in the variable lvl1. Next,

* * *

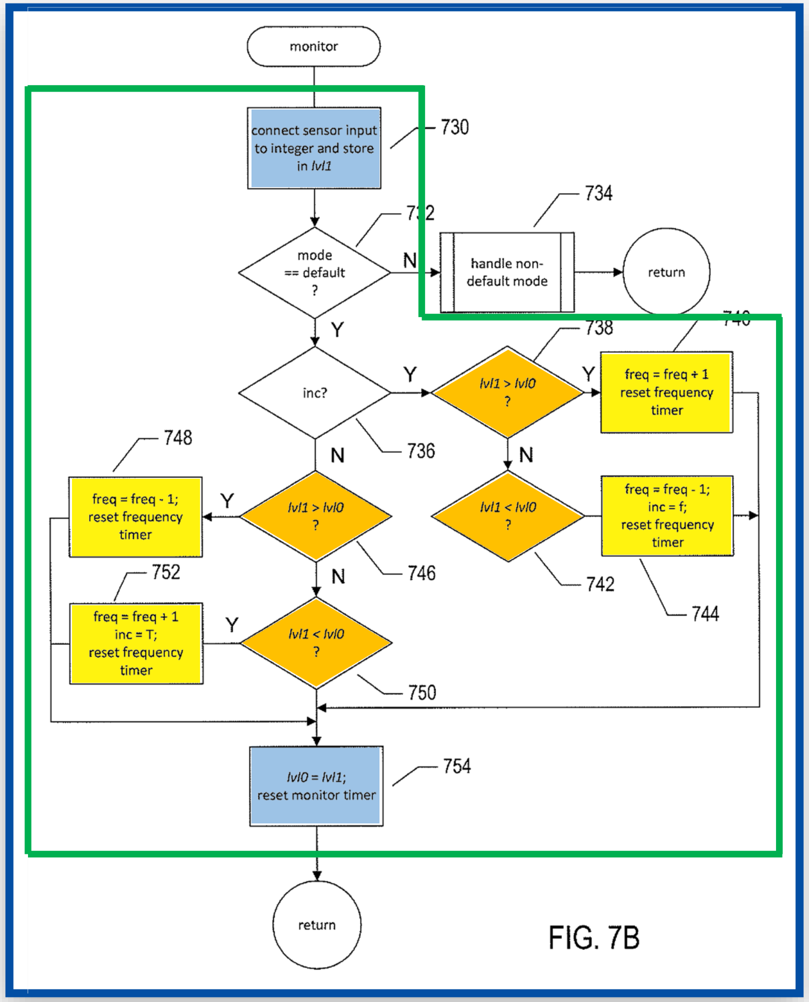
TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

’081 Patent at 7:32-8:9.

Issue 2: Necessary Steps

Function: "receiving output signals from sensors (step 730) … adjusting one or more operational control outputs of the control component (steps 740, 744, 748, 752) according to the received output signals from the sensors (steps 738, 742, 746, 750)"

Step 702
Step 704
Step 706-708
Step 710-712
Step 730-754
(excluding 734)
Step 714-716
Step 760-764



'081 Patent at Figure 7B.

further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine "monitor" determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine "monitor" increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine "monitor" decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine "monitor" increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:50-8:9.

Issue 2: Necessary Steps

Function: "receiving output signals from sensors (step 730) … adjusting one or more operational control outputs of the control component (steps 740, 744, 748, 752) according to the received output signals from the sensors (steps 738, 742, 746, 750)"

Step 702
Step 704
Step 706-708
Step 710-712
Step 730-754
(excluding 734)
Step 714-716
Step 760-764

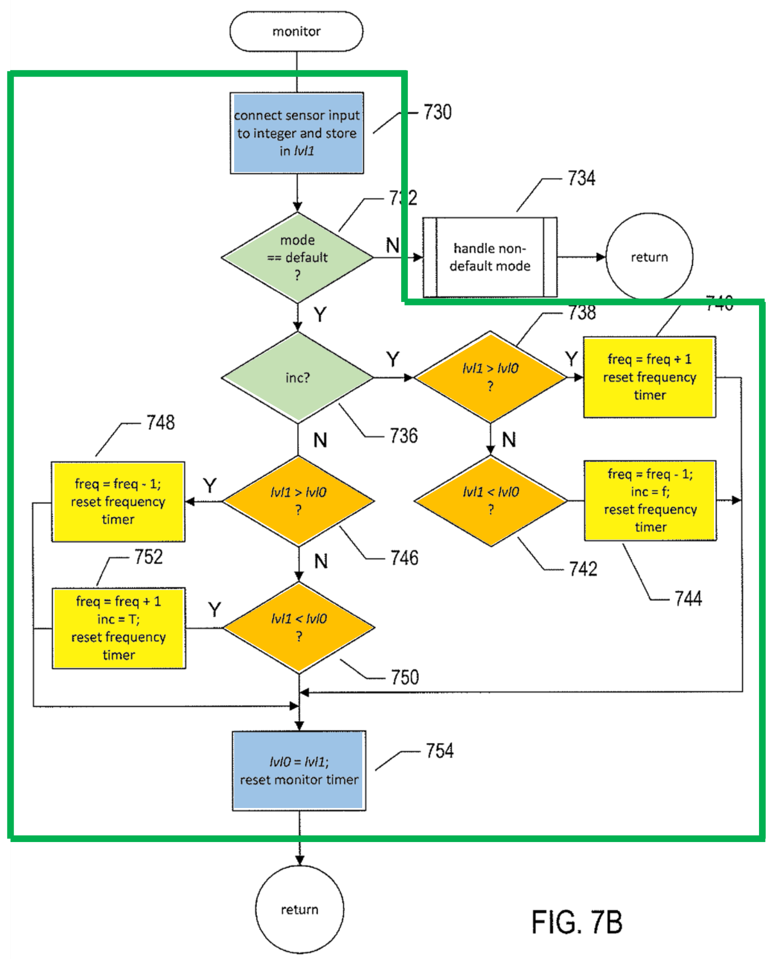


FIG. 7B

'081 Patent at Figure 7B.

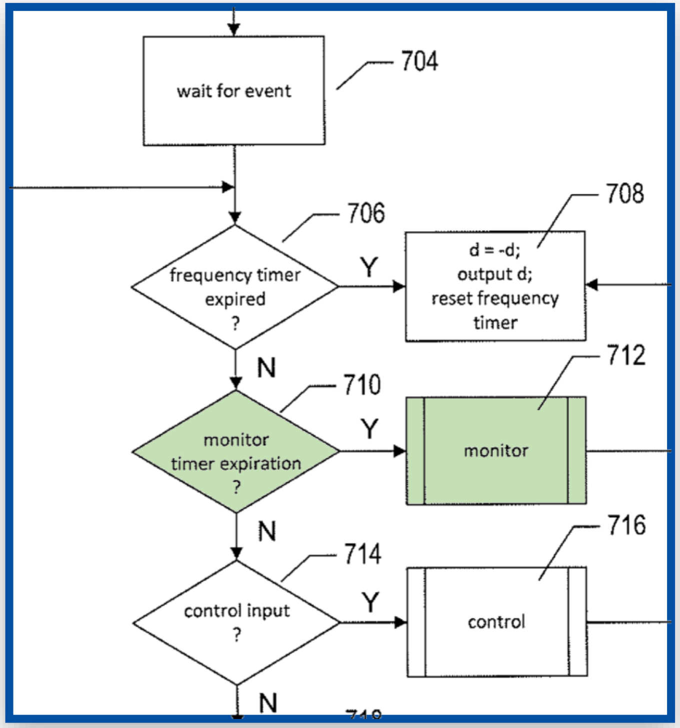
further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine "monitor" determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine "monitor" increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine "monitor" decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine "monitor" increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:50-8:9.

Issue 2: Necessary Steps

Function: "receiving output signals from sensors (step 730) … adjusting one or more operational control outputs of the control component (steps 740, 744, 748, 752) according to the received output signals from the sensors (steps 738, 742, 746, 750)"

Step 702
Step 704
Step 706-708
Step 710-712
Step 730-754
(excluding 734)
Step 714-716
Step 760-764



'081 Patent at Fig. 7A.

Otherwise, when the event is a monitor timer expiration event, as determined in step **710**, then a routine "monitor" is called in step **712**. Otherwise, when the event corresponds to

* * *

FIG. **7**B provides a control-flow diagram for the routine "monitor," called in step **712** of FIG. **7**A. In step **730**, the

'081 Patent at 7:19-21, 7:32-33.

Issue 2: Necessary Steps

In accordance with *WMS Gaming*, reference to the patent specification to identify **specific algorithms** the computer is programmed to perform may be done with explicit reference to text or figures in the specification, by reference to column and line numbers, or by identification of alternative algorithms disclosed in the specification.

* * *

Because the ’567 Patent both specifically claims the embodiments of the algorithms and dedicates a substantial portion of the specification to describe them, excluding such algorithms from the corresponding structure would be contrary to the purpose of means-plus-function construction.

Individual Network, LLC v. Apple, Inc., 2009 WL 81795, at *8-*9 (E.D. Tex. Jan. 12, 2009) (citing *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999)).

Issue 3: Generic Comparison of "Values" is Unsupported

Two flaws with Resonant's construction:

(1) comparing generic "values" is not disclosed, only comparison of integers (i.e., lvl1 versus lvl0)

(2) the only comparison disclosed is to the previous value, not any "different value"

To the extent the Court believes an express algorithm is required in the corresponding structure, RevelHMI maintains its 2024 proposal as a compromise: "an algorithm comprising the following steps: (a) receive the value of an output signal; (b) compare that value to a different value, which could be a previous value; and (c) adjust one or more operational control outputs based on that comparison." *See* Dkt. 69 at 22-24. Samsung addressed that proposal in its

* * *

The parties' core dispute as to the compromise proposal is whether conversion to an integer is required. Samsung does not dispute that non-integers can be compared. Nor can Samsung dispute that receiving an output signal, storing its value in a variable, and comparing that variable to a value is sufficient for performing the claimed function. Integer conversion is an unnecessary

Resonant Supplemental Reply CC Brief (Dkt. 104) at 11-12.

Issue 3: Generic Comparison of "Values" is Unsupported

The algorithm of Figure 7B describes "convert[ing] the sensor input **to an integer** (i.e., not a generic "value")

FIG. 7B provides a control-flow diagram for the routine "monitor," called in step **712** of FIG. **7**A. In step **730**, the routine "monitor" converts the sensor input to an integer representing the current vibrational force produced by the LRVM and stores the integer value in the variable lvl1. Next,

* * *

TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:32-8:9.

This integer (lvl1) is compared to the previous integer (lvl0) (and only the previous integer) to determine how to adjust the value of "freq"

further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine "monitor" determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine "monitor" increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine "monitor" decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine "monitor" increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:50-8:9.

Issue 3: Generic Comparison of "Values" is Unsupported

is required. Samsung does not dispute that non-integers can be compared. Nor can Samsung dispute that receiving an output signal, storing its value in a variable, and comparing that variable to a value is sufficient for performing the claimed function. Integer conversion is an unnecessary step that must be excluded. *Univ. of Pitt.*, 561 F. App'x at 941; *Northrop Grumman*, 325 F.3d at

Resonant Supplemental CC Reply Brief (Dkt. 104) at at 12.

> [T]he trial court erred in expanding the definition of "score line" to include structures not disclosed in the specifications of the Lee patents. Section 112 requires that **the corresponding structure must be "described in the specification."**

Pressure Prods. Med. Supplies, Inc. v. Greatbatch Ltd., 599 F.3d 1308, 1316-17 (Fed. Cir. 2010) (quoting 35 U.S.C. § 112).

“control component” (both patents, claim 3)

Samsung’s Construction

Subject to 35 USC § 112 ¶ 6

Function: receiving output signals from sensors within the [linear] vibration module during operation of the [linear] vibration module and adjusting one or more operational control outputs of the control component according to the received output signals from the sensors

Structure: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. See, e.g., ’081 patent at 6:43-7:24, 7:32-7:42, 7:50-8:30, and equivalents thereof.

“control component” (both patents, claim 4)

Samsung’s Construction	Resonant’s Construction
Subject to 35 USC § 112 ¶ 6 **Function**: adjusting the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters **Structure**: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. See, e.g., ’081 patent at 6:43-7:24, 7:32-7:42, 7:50-8:30, and equivalents thereof.	Subject to 35 USC § 112 ¶ 6 **Function**: same as Samsung **Structure**: No additional algorithmic structure beyond that of claim 1. Microprocessor or microcontroller 602; processor or CPU (*see, e.g.*, Fig. 7A steps 706, 708 and/or Fig. 7B steps 730, 736-754 and/or Fig. 7C Step 762); and equivalents thereof. [if additional algorithmic structure is required] where the microcontroller, processor, CPU, or microprocessor is programmed with an algorithm comprising the following steps: (a) receive the value of an output signal; (b) compare that value to a different value, which could be a previous value; and (c) adjust one or more operational control outputs based on that comparison.

Issue 1: Whether an Algorithm is Required

- The parties agree this term should be construed to have the same structure as claim 3

RevelHMI's Proposal	Samsung's Proposal
Subject to 35 U.S.C. 112 ¶ 6. **<u>Function</u>**: adjusting the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters **<u>Structures</u>**: Same structure as described above with respect to claim 3.	Subject to 35 U.S.C. 112 ¶ 6. **<u>Function</u>**: adjusting the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters **<u>Structures</u>**: Same structure as described above with respect to claim 3.

Resonant Supplemental Opening CC Brief (Dkt. 99) at 10-11.

Issue 1: Whether an Algorithm is Required

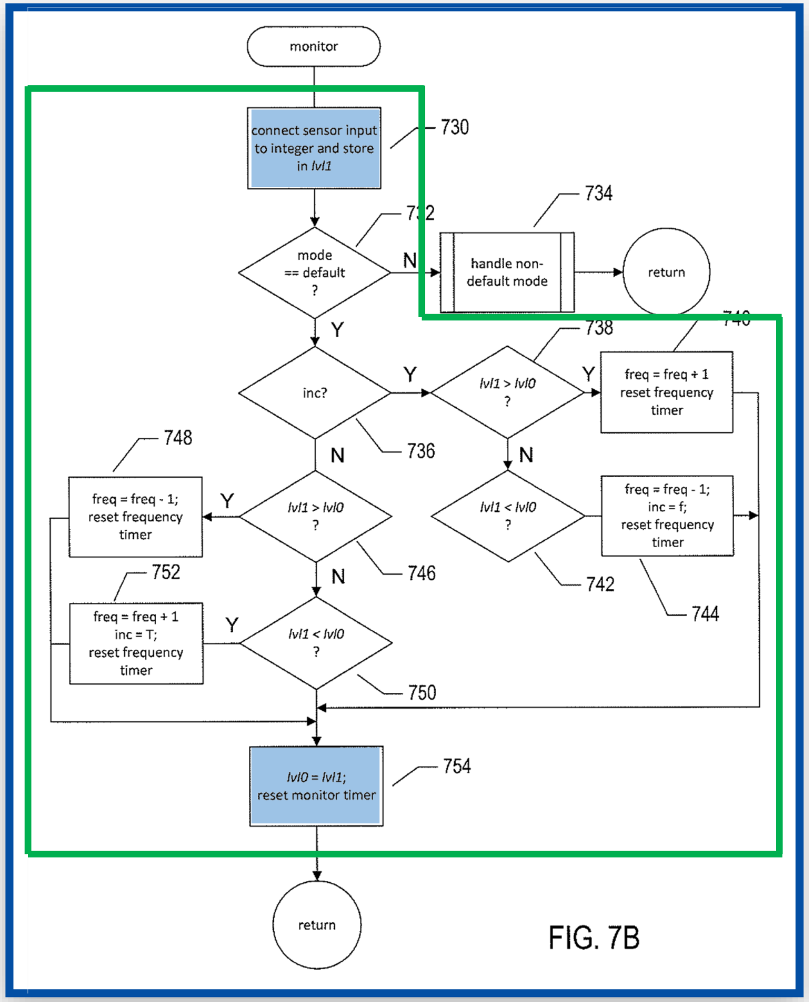
"[I]t is only in the rare circumstances where any general-purpose computer without any special programming can perform the function that an algorithm need not be disclosed." The court found that an algorithm was needed to lend sufficient structure to the terms at issue because "[t]he 'control means' at issue in this case cannot be performed by a general-purpose computer without any special programming. **The function of 'controlling the adjusting means' requires more than merely plugging in a general-purpose computer.**"

EON Corp. IP Holdings LLC v. AT & T Mobility LLC, 785 F.3d 616, 621 (Fed. Cir. 2015) (quoting *Ergo Licensing, LLC v. CareFusion 303, Inc.*, 673 F.3d 1361, 1365 (Fed. Cir. 2012)).

Issue 2: Necessary Steps

Function: "adjusting the one or more operational control outputs (steps 740, 744, 748, 752) … according to the received output signals (step 730) from the sensors (steps 738, 742, 746, 750) in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters"

Step 702
Step 704
Step 706-708
Step 710-712
Step 730-754
(excluding 734)
Step 714-716
Step 760-764



'081 Patent at Figure 7B.

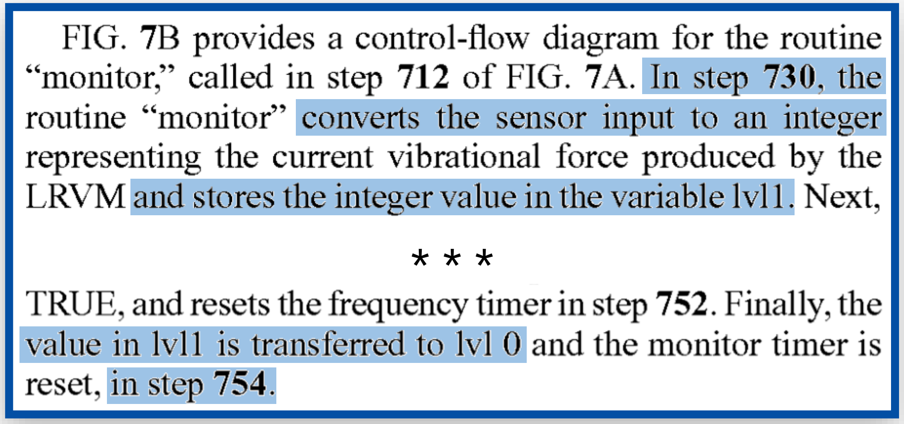


FIG. 7B provides a control-flow diagram for the routine "monitor," called in step 712 of FIG. 7A. In step 730, the routine "monitor" converts the sensor input to an integer representing the current vibrational force produced by the LRVM and stores the integer value in the variable lvl1. Next,

* * *

TRUE, and resets the frequency timer in step 752. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step 754.

'081 Patent at 7:32-8:9.

Issue 2: Necessary Steps

Function: “adjusting the one or more operational control outputs (steps 740, 744, 748, 752) … according to the received output signals (step 730) from the sensors (steps 738, 742, 746, 750) in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters”

Step 702
Step 704
Step 706-708
Step 710-712
Step 730-754
(excluding 734)
Step 714-716
Step 760-764

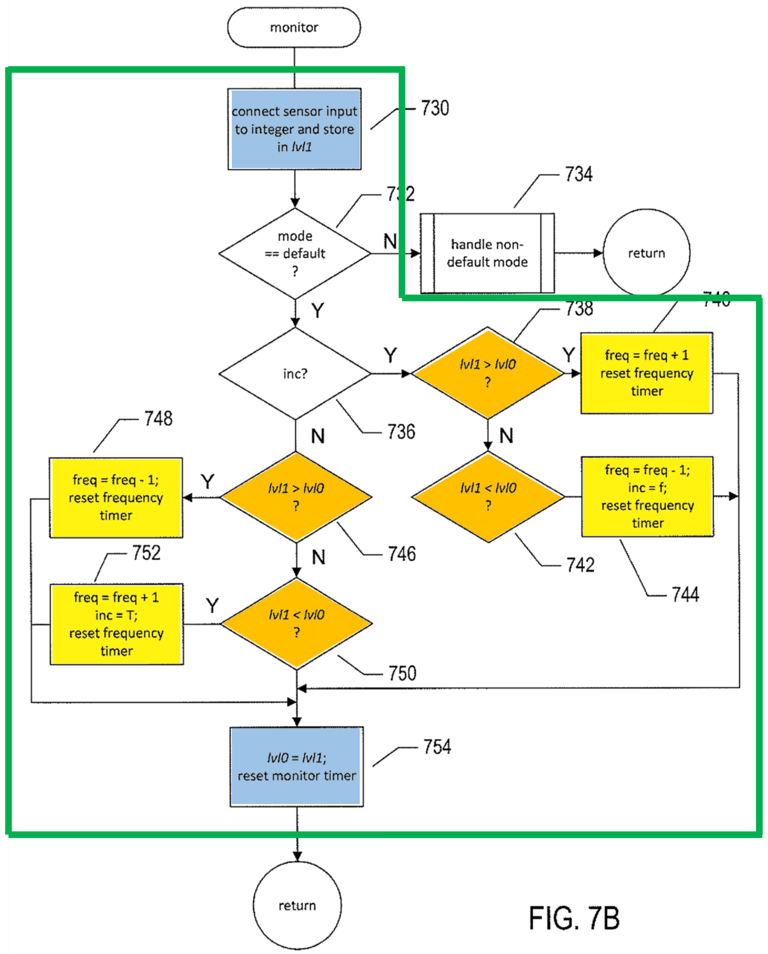


FIG. 7B

’081 Patent at Figure 7B.

further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine “monitor” determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine “monitor” increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine “monitor” decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine “monitor” increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

’081 Patent at 7:50-8:9.

Issue 2: Necessary Steps

Function: “adjusting the one or more operational control outputs (steps 740, 744, 748, 752) … according to the received output signals (step 730) from the sensors (steps 738, 742, 746, 750) in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters”

Step 702

Step 704

Step 706-708

Step 710-712

Step 730-754

(excluding 734)

Step 714-716

Step 760-764

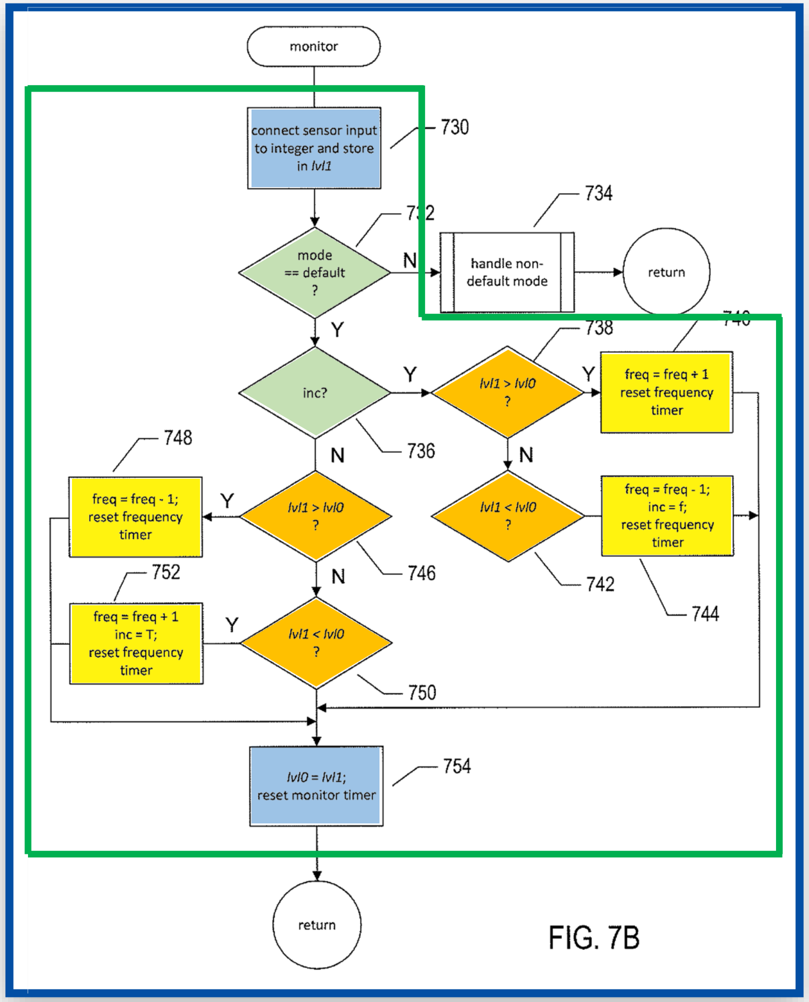


FIG. 7B

’081 Patent at Figure 7B.

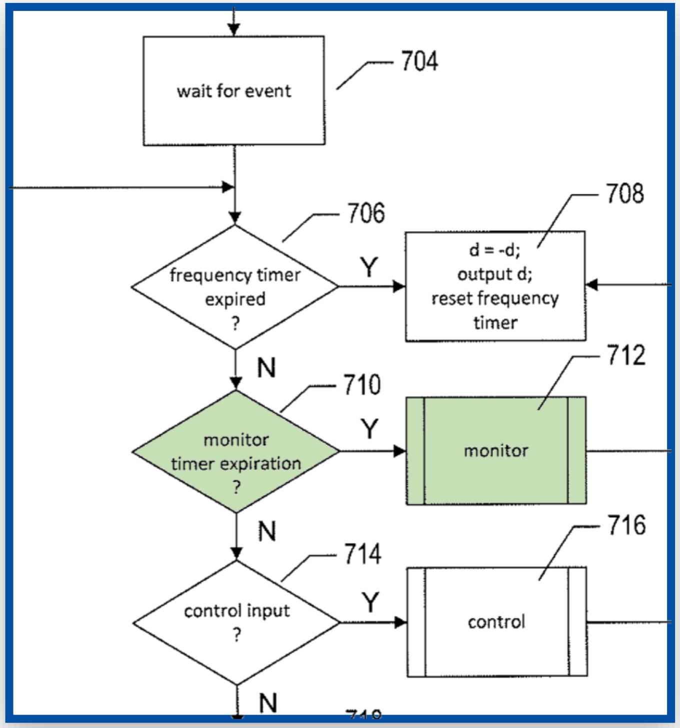
further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine “monitor” determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine “monitor” increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine “monitor” decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine “monitor” increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

’081 Patent at 7:50-8:9.

Issue 2: Necessary Steps

Function: "adjusting the one or more operational control outputs (steps 740, 744, 748, 752) … according to the received output signals (step 730) from the sensors (steps 738, 742, 746, 750) in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters"

- Step 702
- Step 704
- Step 706-708
- **Step 710-712**
- **Step 730-754 (excluding 734)**
- Step 714-716
- Step 760-764



'081 Patent at Fig. 7A.

> Otherwise, when the event is a monitor timer expiration event, as determined in step **710**, then a routine "monitor" is called in step **712**. Otherwise, when the event corresponds to
>
> * * *
>
> FIG. **7B** provides a control-flow diagram for the routine "monitor," called in step **712** of FIG. **7A**. In step **730**, the

'081 Patent at 7:19-21, 7:32-33.

Issue 2: Necessary Steps

In accordance with *WMS Gaming*, reference to the patent specification to identify **specific algorithms** the computer is programmed to perform may be done with explicit reference to text or figures in the specification, by reference to column and line numbers, or by identification of alternative algorithms disclosed in the specification.

* * *

Because the ’567 Patent both specifically claims the embodiments of the algorithms and dedicates a substantial portion of the specification to describe them, excluding such algorithms from the corresponding structure would be contrary to the purpose of means-plus-function construction.

Individual Network, LLC v. Apple, Inc., 2009 WL 81795, at *8-*9 (E.D. Tex. Jan. 12, 2009) (citing *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999)).

Issue 3: Generic Comparison of "Values" is Unsupported

The algorithm of Figure 7B describes "convert[ing] the sensor input **to an integer** (i.e., not a generic "value")

FIG. 7B provides a control-flow diagram for the routine "monitor," called in step **712** of FIG. **7**A. In step **730**, the routine "monitor" converts the sensor input to an integer representing the current vibrational force produced by the LRVM and stores the integer value in the variable lvl1. Next,

* * *

TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:32-8:9.

This integer (lvl1) is compared to the previous integer (lvl0) (and only the previous integer) to determine how to adjust the value of "freq"

further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine "monitor" determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine "monitor" increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine "monitor" decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine "monitor" increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:50-8:9.

Issue 3: Generic Comparison of "Values" is Unsupported

> [T]he trial court erred in expanding the definition of "score line" to include structures not disclosed in the specifications of the Lee patents. Section 112 requires that **the corresponding structure must be "described in the specification."**

Pressure Prods. Med. Supplies, Inc. v. Greatbatch Ltd., 599 F.3d 1308, 1316-17 (Fed. Cir. 2010) (quoting 35 U.S.C. § 112).

"control component" (both patents, claim 4)

Samsung's Construction

Subject to 35 USC § 112 ¶ 6

Function: adjusting the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters

Structure: a microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. See, e.g., '081 patent at 6:43-7:24, 7:32-7:42, 7:50-8:30, and equivalents thereof.

Both patents, claim 5

Samsung's Construction	Resonant's Construction
Subject to 35 U.S.C. § 112 ¶ 6. **Function**: Claim 4 function wherein the one or more operational control parameters is a strength of vibration produced by the [linear] oscillation of the moveable component; and wherein the one or more operational control outputs is a frequency at which the control component drives the moveable component to [linearly] oscillate, the control component dynamically adjusting the power supplied to the driving component to produce [linear] oscillation of the movable component at a resonant frequency for the [linear] vibration module. **Structure**: A microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. *See, e.g.*, '830 patent at 6:52-7:34, 7:42-7:52, 7:60-8:40, and equivalents thereof.	Subject to 35 U.S.C. § 112 ¶ 6. **Function**: dynamically adjusting the power supplied to the driving component to produce [linear] oscillation of the movable component at a resonant frequency for the [linear] vibration module **Corresponding structures**: microcontroller; processor; CPU; microprocessor; and equivalents thereof [if an algorithm is required] Where the corresponding structure is a processor, CPU, or microprocessor, the processor/CPU/microprocessor is programmed with an algorithm comprising the following steps: (a) if the frequency at which the device operates has been increasing and the vibrational force is greater than the previously sensed vibrational force, then increase the frequency—otherwise decrease the frequency; and (b) if the frequency at which the device operates has not been increasing and the vibrational force is greater than the previously sensed vibrational force, then decrease the frequency—otherwise increase the frequency .

Issue 1: “Wherein” Clauses Concern the Function of the Control Component

[Plaintiff’s] arguments are unavailing. First, **the “wherein” clause does not recite structure, but rather concerns the function of the sampling unit**. As to [plaintiff’s] comparison of the language of Claims 2 and 3, [plaintiff] cites no authority suggesting the use of “means” in one claim and the failure to use “means” in another is relevant to whether a term is subject to § 112, ¶ 6. Finally, with respect to any description of the element’s operation being sufficient to avoid invoking § 112, ¶ 6, there must still be some recitation of structure related to the term somewhere in the intrinsic record. Here, however, neither the claim nor the specification discusses any such structure.

Finesse Wireless LLC v. AT&T Mobility LLC, No. 2:21-CV-00316-JRG, 2022 WL 3686478, at *10 (E.D. Tex. Aug. 24, 2022).

Issue 1: Sufficient Structure Recited

Samsung's construction encapsulates the full scope of claim 5
Resonant's construction only captures the "dynamically adjusting" portion

"wherein the one or more operational control parameters is a strength of vibration…" (e.g., "strength" in step 760 and setting "lvl1" in step 730)

FIG. 7B provides a control-flow diagram for the routine "monitor," called in step **712** of FIG. **7**A. In step **730**, the routine "monitor" converts the sensor input to an integer representing the current vibrational force produced by the LRVM and stores the integer value in the variable lvl1. Next,

'081 Patent at 7:32-36.

"wherein the one or more operational control outputs is a frequency [of oscillation]" (e.g., setting "freq" in steps 740, 744, 748, and 752)

has occurred and appropriately handle that event. When the frequency timer has expired, as determined in step **706**, the value of the output signal d is flipped, in step **708**, and output to the H-bridge switch, with the frequency timer being reset to trigger a next frequency-related event. The frequency-timer interval is determined by the current value of the variable freq.

'081 Patent at 7:13-18.

"dynamically adjusting the power supplied to the driving component to produce [linear] oscillation of the movable component at a resonant frequency for the [linear] vibration module" (e.g., changing direction of current in steps 706 and 708)

Issue 1: Sufficient Structure Recited

Samsung's construction encapsulates the full scope of claim 5
Resonant's construction only captures the "dynamically adjusting" portion

"wherein the one or more operational control parameters is a strength of vibration…" (e.g., "strength" in step 760 and setting "lvl1" in step 730)

"wherein the one or more operational control outputs is a frequency [of oscillation]" (e.g., setting "freq" in steps 740, 744, 748, and 752)

"dynamically adjusting the power supplied to the driving component to produce [linear] oscillation of the movable component at a resonant frequency for the [linear] vibration module" (e.g., changing direction of current in steps 706 and 708)

further described in the control-flow diagrams. In the case that the operational mode is the default mode, in which the control program seeks to optimize the vibrational force generated by the device, in step **736**, the routine "monitor" determines whether the local variable inc is set to TRUE. If so, then the control program is currently increasing the frequency at which the device operates in order to obtain the resonance frequency. When lvl1 is greater than lvl0, as determined in step **738**, then the vibrational force has been recently increased by increasing the frequency, and so the routine "monitor" increases the frequency again, in step **740**, and correspondingly resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **742**, then the control program has increased the frequency past the resonance frequency, and therefore, in step **744**, the control program decreases the frequency, sets the variable inc to FALSE, and correspondingly resets the frequency timer. In similar fashion, when the variable inc is initially FALSE, as determined in step **736**, and when lvl1 is greater than lvl0, as determined in step **746**, the routine "monitor" decreases the value stored in the variable freq, in step **748** and resets the frequency timer. Otherwise, when lvl1 is less than lvl0, as determined in step **750**, then the routine "monitor" increases the value stored in the variable freq, sets the variable inc to TRUE, and resets the frequency timer in step **752**. Finally, the value in lvl1 is transferred to lvl 0 and the monitor timer is reset, in step **754**.

'081 Patent at 7:50-8:9.

Both patents, claim 5

Samsung’s Construction

Subject to 35 U.S.C. § 112 ¶ 6.

Function: Claim 4 function wherein the one or more operational control parameters is a strength of vibration produced by the [linear] oscillation of the moveable component; and wherein the one or more operational control outputs is a frequency at which the control component drives the moveable component to [linearly] oscillate, the control component dynamically adjusting the power supplied to the driving component to produce [linear] oscillation of the movable component at a resonant frequency for the [linear] vibration module.

Structure: A microcontroller, a processor, a microprocessor, or a CPU contained within the vibration module that performs the algorithm shown in Figure 7A excluding steps 718-724, with reference to all steps shown in Figure 7B excluding Step 734, and all steps shown in Figure 7C, or the algorithm described in the corresponding text. *See, e.g.*, ’830 patent at 6:52-7:34, 7:42-7:52, 7:60-8:40, and equivalents thereof.

Both patents, claim 6

Samsung's Construction	Resonant's Construction
Subject to 35 U.S.C. § 112 ¶ 6. **<u>Function</u>**: Claim 4 function wherein the one or more operational control parameters include both a strength of vibration produced by the [linear] oscillation of the moveable component and a current operational mode; and wherein the one or more operational control outputs is a control output that determines a current supplied by the power supply to the driving component and a frequency at which the control component drives the moveable component to [linearly] oscillate. **<u>Structure</u>**: Indefinite.	Plain and ordinary meaning; not subject to 35 U.S.C. § 112 ¶ 6. If subject to 35 U.S.C. § 112 ¶ 6 and Samsung's function is accepted, then: **<u>Structures</u>**: microcontroller; processor; CPU; microprocessor; and equivalents thereof [if an algorithm is required] Where the corresponding structure is a processor, CPU, or microprocessor, the processor/CPU/microprocessor is programmed with an algorithm comprising the following steps: (a) set the mode and strength to [default values or] values representing selections made by user input to the user input features; and (b) provide a corresponding output to the power supply so that the power supply provides a corresponding current to the driving component

Issue 1: “Wherein” Clauses Concern the Function of the Control Component

[Plaintiff’s] arguments are unavailing. First, **the “wherein” clause does not recite structure, but rather concerns the function of the sampling unit**. As to [plaintiff’s] comparison of the language of Claims 2 and 3, [plaintiff] cites no authority suggesting the use of “means” in one claim and the failure to use “means” in another is relevant to whether a term is subject to § 112, ¶ 6. Finally, with respect to any description of the element’s operation being sufficient to avoid invoking § 112, ¶ 6, there must still be some recitation of structure related to the term somewhere in the intrinsic record. Here, however, neither the claim nor the specification discusses any such structure.

Finesse Wireless LLC v. AT&T Mobility LLC, No. 2:21-CV-00316-JRG, 2022 WL 3686478, at *10 (E.D. Tex. Aug. 24, 2022).

Issue 1: "Wherein" Clauses Concern the Function of the Control Component

Function (claim 4)

adjusting the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the [linear] vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters

"Wherein" clauses (claim 6)

wherein the one or more operational control outputs is a control output that determines a current supplied by the power supply to the driving component and a frequency at which the control component drives the moveable component to [linearly] oscillate.

wherein the one or more operational control parameters include both a strength of vibration produced by the [linear] oscillation of the moveable component and a current operational mode

Issue 2: No Corresponding Structure

Function (claim 4): "adjusting the one or more operational control outputs … according to the received output signals from the sensors…"

4. The linear vibration module of claim 1 wherein the control component adjusts the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the linear vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters.

'081 Patent at claim 4.

Function (claim 6): "Claim 4 function … wherein the one or more operational control outputs is a control output that determines a **current supplied by the power supply to the driving component** …"

6. The linear vibration module of claim 4

wherein the one or more operational control parameters include both a strength of vibration produced by the linear oscillation of the moveable component and a current operational mode; and

wherein the one or more operational control outputs is a control output that determines a current supplied by the power supply to the driving component and a frequency at which the control component drives the moveable component to linearly oscillate.

'081 Patent at claim 6.

Issue 2: No Corresponding Structure

Function (claim 4): "adjusting the one or more operational control outputs … according to the received output signals from the sensors…"

Function (claim 6): "Claim 4 function … wherein the one or more operational control outputs is a control output that determines a **current supplied by the power supply to the driving component** …"

"the control component adjusts the one or more operational control outputs [that determines a current supplied by the power supply to the driving component] of the control component according to the received output signals from the sensors"

4. The linear v… control componen… trol outputs of th… received output sig… quent operation o… desired outputs fro… to one or more operational control parameters.

'081 Patent at claim 4.

…ol parameters …oduced by the …nent and a cur-… …ol outputs is a …upplied by the power supply to the driving component and a frequency at which the control component drives the moveable component to linearly oscillate.

'081 Patent at claim 6.

Issue 2: No Corresponding Structure

Function: "wherein the one or more operational control outputs is a control output that determines a **current supplied by the power supply to the driving component** …"

- The current supplied by the power supply is only determined by "the current state of control features *in the user interface*"
- **No disclosure** describing how current supplied by the power supply is adjusted *according to* sensor output signals

FIG. 7C provides a control-flow diagram for the routine "control," called in step **716** in FIG. **7**A. This routine is invoked when a change in the user controls has occurred. In step **760**, the variables mode and strength are set to the currently selected mode and vibrational strength, represented by the current states of control features in the user interface. Next, in step **762**, the routine "control" computes an output value p corresponding to the currently selected strength, stored in the variable strength, and outputs the value p to the power supply so that the power supply outputs an appropriate current to the coil. Finally, in step **764**, the routine "control" computes a new monitor timer interval and resets the monitor timer accordingly.

'081 Patent at 8:10-22.

Issue 2: No Corresponding Structure

Second, the Court must identify the corresponding structure in the patent specification that performs the function. **The corresponding structure must be capable of performing the claimed function.** Structure disclosed in the specification is "corresponding" structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim.

Nat'l Oilwell DHT, L.P. v. Amega W. Servs., LLC, 2019 WL 1787250, at *8 (E.D. Tex. Apr. 24, 2019) (internal citations omitted).

In the **absence of any further disclosure**, we also find that the specification fails to disclose sufficient structure for the "monitoring" function. Accordingly, the district court did not err when it determined that **this term is indefinite**.

Media Rts. Techs., Inc. v. Cap. One Fin. Corp., 800 F.3d 1366, 1375 (Fed. Cir. 2015)

Both patents, claim 6

Samsung's Construction
Subject to 35 U.S.C. § 112 ¶ 6. **Function**: Claim 4 function wherein the one or more operational control parameters include both a strength of vibration produced by the [linear] oscillation of the moveable component and a current operational mode; and wherein the one or more operational control outputs is a control output that determines a current supplied by the power supply to the driving component and a frequency at which the control component drives the moveable component to [linearly] oscillate. **Structure**: Indefinite.

“wherein the one or more operational control outputs” (both patents, claim 6)

Samsung’s Construction	Resonant’s Construction
wherein the one or more operational control outputs is a control output that determines a current supplied by the power supply to the driving component and **is** a frequency at which the control component drives the moveable component to [linearly] oscillate	Plain and ordinary meaning; not indefinite

"wherein the one or more operational control outputs" (both patents, claim 6)

6. The linear vibration module of claim **4**
wherein the one or more operational control parameters include both a strength of vibration produced by the linear oscillation of the moveable component and a current operational mode; and
wherein the one or more operational control outputs is a control output that determines a current supplied by the power supply to the driving component and a frequency at which the control component drives the moveable component to linearly oscillate.

'081 Patent at claim 6.

Two Interpretations:

(1) a single control output that both determines a current supplied by the power supply and a frequency at which the control component drives … oscillat[ion]

(2) a) a control output that determines a current supplied by the power supply to the driving component and b) a control output that is a frequency at which the control component drives … oscillat[ion]

"wherein the one or more operational control outputs" (both patents, claim 6)

Dr. Clifton Forlines

Samsung's
Expert Witness

62. Setting aside the issue discussed above regarding claim 4 in Section V.C, claim 4, on which claim 6 depends, recites one or more operational control outputs. Reviewing claim 6, a POSITA would not be able to determine whether the claim refers to one or two different operational control outputs. For example, due to the ambiguity in the grammar, there are at least two possible interpretations of the language of claim 6: (1) a single control output that determines both current and frequency; or (2) two control outputs, one control output that "is a control output that determines a current …" and a second control output that "is a frequency…"

Forlines Declaration (Dkt. 69-5 (Ex. 4)) at ¶ 62.

Issue 3: Generic Comparison of "Values" is Unsupported

Rather than providing an unambiguous, clear meaning, therefore, the claim language leaves uncertainty about whether, contrary to [plaintiff's] view, the slide must move along the support surface (and not the ledge surface) as it enters the bracket and moves toward the slot. **In such circumstances, we turn to the specification to resolve the uncertainty.**

World Class Tech. Corp. v. Ormco Corp., 769 F.3d 1120, 1124 (Fed. Cir. 2014) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005)).

"wherein the one or more operational control outputs" (both patents, claim 6)

<u>Two Interpretations:</u>

(1) a single control output that <u>both</u> determines a current supplied by the power supply <u>and</u> a frequency at which the control component drives … oscillat[ion] → Not disclosed

(2) a) a control output that determines a current supplied by the power supply to the driving component and b) a control output that is a frequency at which the control component drives … oscillat[ion] →

<u>Always two outputs</u>

- "strength"/"p" = current supplied by the power supply
- "freq"/"d" = frequency of oscillation

"wherein the one or more operational control outputs" (both patents, claim 6)

Two Interpretations:

(1) a single control output that both determines a current supplied by the power supply and a frequency at which the control component drives … oscillat[ion]

(2) a) a control output that determines a current supplied by the power supply to the driving component and b) a control output that is a frequency at which the control component drives … oscillat[ion]

cation is directed. FIG. **7**A provides a control-flow diagram for the high-level control program. The program begins execution, in step **702**, upon a power-on event invoked by a user through a power button or other user control. In step **702**, various local variables are set to default values, including the variables: (1) mode, which indicates the current operational mode of the device; (2) strength, a numerical value corresponding to the current user-selected strength of operation, corresponding to the electrical current applied to the coil; (3) lvl0, a previously sensed vibrational strength; (4) lvl1, a currently sensed vibrational strength; (5) freq, the current frequency at which the direction of current is alternated in the coil; (6) d, the control output to the H-bridge switch; and (7) inc., a Boolean value that indicates that the frequency is currently being increased. Next, in step **704**, the control pro-

'081 Patent at 6:47-61.

"wherein the one or more operational control outputs" (both patents, claim 6)

Two Interpretations:

(1) a single control output that both determines a current supplied by the power supply and a frequency at which the control component drives … oscillat[ion]

(2) a) a control output that determines a current supplied by the power supply to the driving component and b) a control output that is a frequency at which the control component drives … oscillat[ion]

FIG. 7C provides a control-flow diagram for the routine "control," called in step 716 in FIG. 7A. This routine is invoked when a change in the user controls has occurred. In step 760, the variables mode and strength are set to the currently selected mode and vibrational strength, represented by the current states of control features in the user interface. Next, in step 762, the routine "control" computes an output value p corresponding to the currently selected strength, stored in the variable strength, and outputs the value p to the power supply so that the power supply outputs an appropriate current to the coil. Finally, in step 764, the routine "control" computes a new monitor timer interval and resets the monitor timer accordingly.

'081 Patent at 8:10-22.

has occurred and appropriately handle that event. When the frequency timer has expired, as determined in step 706, the value of the output signal d is flipped, in step 708, and output to the H-bridge switch, with the frequency timer being reset to trigger a next frequency-related event. The frequency-timer interval is determined by the current value of the variable freq.

'081 Patent at 7:13-18.

"wherein the one or more operational control outputs" (both patents, claim 6)

Two Interpretations:

(1) a single control output that both determines a current supplied by the power supply and a frequency at which the control component drives … oscillat[ion]

(2) a) a control output that determines a current supplied by the power supply to the driving component and b) a control output that is a frequency at which the control component drives … oscillat[ion]

- It is not possible to determine *frequency* from current supplied
- It is not possible to determine *current supplied* from frequency

No disclosed single control output that determines both current supplied by power supply and frequency of oscillation

“wherein the one or more operational control outputs” (both patents, claim 6)

Samsung’s Construction
wherein the one or more operational control outputs is a control output that determines a current supplied by the power supply to the driving component and **is** a frequency at which the control component drives the moveable component to [linearly] oscillate

"claim 1" (both patents, claim 4)

Claim Term	Samsung's Construction	Resonant's Construction
"claim 1"	Plain and ordinary meaning	"claim 3"; not indefinite
"the one or more operational control outputs"	Indefinite/no antecedent basis	Plain and ordinary meaning; not indefinite
"the received output signals" / "the received output signals from the sensors"	Indefinite/no antecedent basis	Plain and ordinary meaning; not indefinite
"the sensors" / "the one or more sensors"	Indefinite/no antecedent basis	Plain and ordinary meaning; not indefinite

"claim 1" (both patents, claim 4)

Dr. Clifton Forlines

Samsung's
Expert Witness

52. In my opinion, a POSITA would have understood there are two plausible interpretations of the terms/claim 4 that could correct the error. The first plausible interpretation/correction would be to remove the definite article "the" in each of the terms. This change would eliminate the need to find antecedent basis for each of these the terms at issue by eliminating the reference to an antecedent use of the term. The second plausible interpretation/correction, which I understand Resonant to be advocating for, is to change the dependence of claim 4 from claim 1 to claim 3.[6] This change would provide antecedent basis in

Forlines Declaration (Dkt. 69-5 (Ex. 4)) at ¶ 52.

"claim 1" (both patents, claim 4)

Judicial correction will not resolve all issues with antecedent basis

3. The linear vibration module of claim 1 wherein the control component receives output signals from sensors within the linear vibration module during operation of the linear vibration module and adjusts one or more operational control outputs of the control component according to the received output signals from the sensors.

'081 Patent at claim 3.

4. The linear vibration module of claim 1 wherein the control component adjusts the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the linear vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters.

'081 Patent at claim 4.

Claim Term	Antecedent Basis in Cl. 3?
"the one or more operational control outputs"	Yes
"the received output signals" / "the received output signals from the sensors"	Yes
"the sensors"	Yes
"the one or more sensors"	No

"claim 1" (both patents, claim 4)

Applicant chose to first recite "sensors" in plural form
then recited "the one or more sensors" which includes the singular form

4. The linear vibration module of claim 1 wherein the control component adjusts the one or more operational control outputs of the control component according to the received output signals from the sensors in order that subsequent operation of the linear vibration module produces desired outputs from the one or more sensors corresponding to one or more operational control parameters.

'081 Patent at claim 4.

“claim 1” (both patents, claim 4)

In accordance with common English usage, **we presume a plural term refers to two or more items.** That presumption can be overcome when the broader context shows a different meaning applies. This is simply an application of the general rule that claim terms are usually given their plain and ordinary meaning.

Apple Inc. v. MPH Techs. Oy, 28 F.4th 254, 261 (Fed. Cir. 2022)
(internal citations omitted)

"claim 1" (both patents, claim 4)

Even assuming "claim 1" means "claim 3," resolution still requires one of four options:

(1) Change "sensors" in claim 3 to "one or more sensors"

This broadens claim 3

(2) Change "the sensors" in claim 4 to "one or more sensors"

This makes the sensors in claim 4 different from those in claim 3

(3) Change "the one or more sensors" recited in claim 4 to "one or more sensors"

This makes claim 4 include two different sets of sensor(s)

(4) Change "the one or more sensors" recited in claim 4 to "the sensors"

This reads "one or more" out of the claim

“claim 1” (both patents, claim 4)

Resonant v. Samsung – Supplemental Reply Claim Construction Brief

- Resonant argues this is a “one-character correction”

and “one or more sensors” refer to the same thing. Thus, correcting claim 4 to depend from claim 3 results in an internally consistent and clear claim scope. Samsung does not prove indefiniteness by clear and convincing evidence, and the Court should adopt RevelHMI’s one-character correction.

Dkt. 104 at 4-5.

"claim 1" (both patents, claim 4)

Samsung v. Resonant (PTAB) – Patent Owner Response

- Resonant selectively cited only a portion of the claim to make it seem like only one character

Claim 4 contains a clear typographical error in the identification of which claim each depends from. Claim 3 introduces limitations of "sensors" and "one or more operational control outputs of the control component." (Ex. 1001, claim 3.) Claim 4 then refers to "the sensors" and "the one or more operational control outputs." (Ex. 1001, claim 4.) Ordinarily, use of "the" in this manner in a patent claim invokes an antecedent claim term. The natural conclusion is that these terms in claim 4 are meant to refer to the corresponding terms in claim 3, and thus that claim 4 was means to depend on claim 3.

Samsung IPR Patent Owner Response (Dkt. 102-12 (Ex. 27)) at 17-18.

“claim 1” (both patents, claim 4)

> Since we **cannot know what correction is necessarily appropriate** or how the claim should be interpreted, we must hold claim 13 of the ’578 patent **invalid for indefiniteness** in its present form. … The claim is invalid for indefiniteness because it is “insolubly ambiguous” and not “amenable to construction.”

Novo Indus., L.P. v. Micro Molds Corp., 350 F.3d 1348, 1358 (Fed. Cir. 2003).

“claim 1” (both patents, claim 4)

Claim Term	Samsung’s Construction
“claim 1”	Plain and ordinary meaning
“the one or more operational control outputs”	Indefinite/no antecedent basis
“the received output signals” / “the received output signals from the sensors”	Indefinite/no antecedent basis
“the sensors” / “the one or more sensors”	Indefinite/no antecedent basis

“vibration module” (both patents, claims 1, 3-6)

Samsung’s Construction	Resonant’s Construction
a vibration-generating device that can be incorporated in a wide variety of appliances, devices, and systems to provide vibrational forces	Plain and ordinary meaning

"vibration module" (both patents, claims 1, 3-6)

The specification repeatedly and consistently describes a vibration module as vibration generating devices "that can be incorporated in a wide variety of appliances, devices, and systems to provide vibrational forces"

(57) **ABSTRACT**

The current application is directed to various types of linear vibrational modules, including linear-resonant vibration modules, that can be incorporated in a wide variety of appliances, devices, and systems to provide vibrational forces. The vibrational forces are produced by linear oscillation of a weight or member, in turn produced by rapidly alternating the polarity of one or more driving electromagnets. Feedback control is used to maintain the vibrational frequency of linear-resonant vibration module at or near the resonant frequency for the linear-resonant vibration module. Both linear vibration modules and linear-resonant vibration modules can be designed to produce vibrational amplitude/frequency combinations throughout a large region of amplitude/frequency space.

'081 Patent at Abstract.

The current application is directed to various types of linear vibrational modules, including linear-resonant vibration modules, that can be incorporated in a wide variety of appliances, devices, and systems to provide vibrational forces. The

'081 Patent at 3:7-10.

TECHNICAL FIELD

The current application is related to vibration-generating devices and, in particular, to vibration modules that can be incorporated into a wide variety of different types of electromechanical devices and systems to produce vibrations of selected amplitudes and frequencies over a wide range of amplitude/frequency space.

'081 Patent at 1:13-20.

The current application is directed to various linear vibration modules ("LRMs"), including various types of linear-resonant vibration modules ("LRVMs"), that can be used within a wide variety of different types of appliances, devices, and systems, to generate vibrational forces. The LVMs and

'081 Patent at 4:13-17.

"vibration module" (both patents, claims 1, 3-6)

"Where, as here, a patent **repeatedly** and **consistently** characterizes a claim term in a particular way, it is proper to construe the claim term in accordance with that characterization."

* * *

"[Defendant's] proposed construction would expand the scope of the claims far beyond anything described in the specification"

Wisconsin Alumni Rsch. Found. v. Apple Inc., 905 F.3d 1341, 1351-52 (Fed. Cir. 2018)
(internal quotations omitted)

“vibration module” (both patents, claims 1, 3-6)

The experts agree “vibrating modules” are used *in*, or incorporated *into*, other devices

Dr. Richard Hooper

Resonant’s Expert Witness

9. Other applications for LVMs and LRVMs include mobile phones, vibration-driven appliances, such as hair-trimming appliances, electric toothbrushes, electric toy football games, and many other appliances, devices, and systems. In my experience, it is also not uncommon to find vibrating modules that produce haptic feedback in hand-held devices for remotely controlling robotic manipulator systems, though these have been rotational vibrating modules.

Hooper Declaration (Dkt. 69-4 (Ex. 3)) at ¶ 9.

Dr. Clifton Forlines

Samsung’s Expert Witness

35. A POSITA at the priority date of the invention would have understood that a “module” as used in the field of electronic consumer product design refers to a component of a larger appliance, device, or system (either in hardware or software). Furthermore, modules are generally “modular,” meaning they can be incorporated into multiple different appliances, devices, or systems. A POSITA would have understood that a “vibration module” is a module with the function of providing vibrational forces to an enclosing device or system.

Forlines Declaration (Dkt. 69-5 (Ex. 4)) at ¶ 35.

"vibration module" (both patents, claims 1, 3-6)

Samsung's construction is also consistent with contemporary definitions of a "module" (Ex. 4 (Forlines Decl.) at ¶ 37)

module *noun* **1.** a part that together with other parts makes up another structure or system **2.** COMPUT a small section of a large program that can, if required, function independently as a program in its own right **3.** COMPUT a self-contained piece of hardware that can be connected with other modules to form a new system ○ *A multi-function analog interface module includes analog to digital and digital to analog converters.*

Dictionary of Science and Technology (Dkt. 102-1 (Ex. 16)) at -913.

module **1.** A self-contained, and usually standardized, unit that performs one or more tasks, and which can be incorporated into a complete system. A module has defined performance characteristics, and can be disconnected and removed as a single unit, in addition to being replaced by an equivalent. For example, a circuit board with standardized dimensions and leads. **2.** An independent and self contained unit used within a **modular approach**.

The Wiley Electrical and Electronics Engineering Dictionary (Dkt. 102-2 (Ex. 17)) at -917.

“vibration module” (both patents, claims 1, 3-6)

Samsung’s Construction
a vibration-generating device that can be incorporated in a wide variety of appliances, devices, and systems to provide vibrational forces

“driving component” (both patents, claim 1)

Samsung’s Construction	Resonant’s Construction
Subject to 35 U.S.C. § 112 ¶ 6. **Function**: driving the moveable component [in each of two opposite directions/to oscillate] within the housing **Structure**: One or more electromagnetic coils.	Subject to 35 U.S.C. § 112 ¶ 6. **Function**: same as Samsung **Structure**: One or more coils or electromagnets.

"driving component" (both patents, claim 1)

The patents consistently describe control via electromagnetic **coils**

FIG. 7C provides a control-flow diagram for the routine "control," called in step **716** in FIG. **7**A. This routine is invoked when a change in the user controls has occurred. In step **760**, the variables mode and strength are set to the currently selected mode and vibrational strength, represented by the current states of control features in the user interface. Next, in step **762**, the routine "control" computes an output value p corresponding to the currently selected strength, stored in the variable strength, and outputs the value p to the power supply so that the power supply outputs an appropriate current to the coil. Finally, in step **764**, the routine "control" computes a new monitor timer interval and resets the monitor timer accordingly.

'081 Patent at 8:10-22.

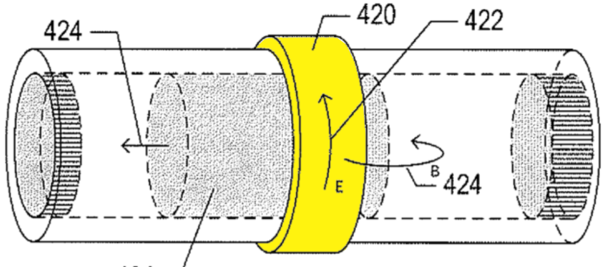


FIG. 4B

'081 Patent at Fig 4.

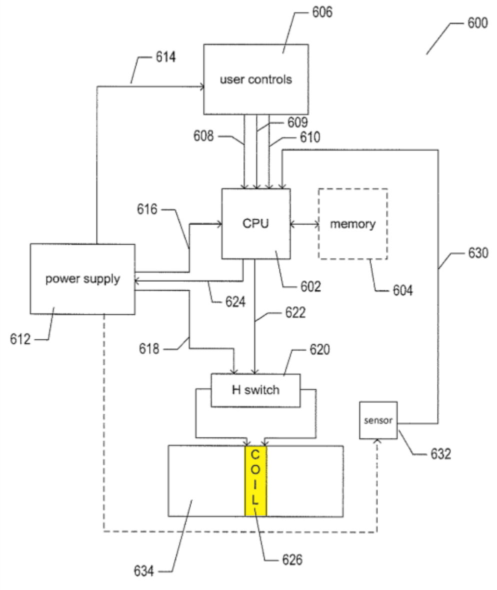


FIG. 6

'081 Patent at Fig 6.

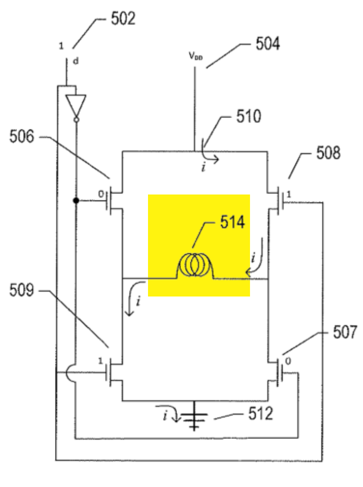


FIG. 5A

'081 Patent at Fig 5.

as in FIG. **4**B. Thus, by a combination of a magnetic field with rapidly reversing polarity, generated by alternating the direction of current applied to the coil, and by the repulsive forces between the weight magnet and the disk-like magnets at each end of the hollow, cylindrical chamber, the weight linearly oscillates back and forth within the cylindrical housing **402**, imparting a directional force at the ends of the cylindrical chamber with each reversal in direction.

'081 Patent at 5:24-34.

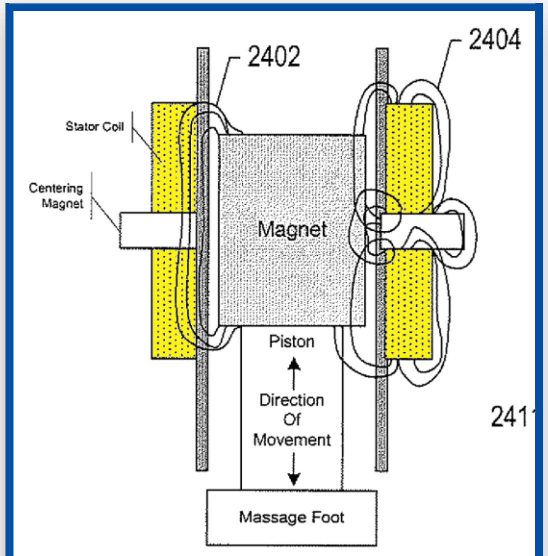


FIG. 24A

'081 Patent at Fig 24.

"driving component" (both patents, claim 1)

Using non-coil electromagnets would require a different control structure

Dr. Clifton Forlines

Samsung's
Expert Witness

THE WITNESS: Electromagnetic coils and other types of electromagnets can provide the same functionality.

However, they're not equivalent in that -- well, I mean, there are electromagnets which are not coils, and furthermore in the context of this work, the non-coiled -- non-coil electromagnets, would be controlled in, you know, different manners.

Forlines Deposition Transcript (Dkt. 69-6 (Ex. 5)) at 82:11-18.

“driving component” (both patents, claim 1)

A POSITA reading the patents would understand the “driving components” to be “coils of wires”

Dr. Clifton Forlines

Samsung’s
Expert Witness

A. Again, we're back to column 15. And again, as I say in the report, the -- the POSITA reading this document is going to, you know, understand that, you know, these driving components are, you know, coils of wires, you know, wrapped around this cylindrical housing.

I don't see that -- you know, it's my opinion they wouldn't interpret these electromagnets as anything, you know, as anything but.

Forlines Deposition Transcript (Dkt. 69-6 (Ex. 5)) at 84:17-25.

"driving component" (both patents, claim 1)

Samsung's Construction
Subject to 35 U.S.C. § 112 ¶ 6. **Function**: driving the moveable component [in each of two opposite directions/to oscillate] within the housing **Structure**: One or more electromagnetic coils.